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NORSE DISCOVERIES IN AMERICA.

BY

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Discredited at the start, the Norse claim of the discovery of the American continent five centuries before Columbus has gradually gained a respectful hearing from American scholars, and to-day, nine hundred years after the interesting event, stands finally admitted in the opinion of those best qualified to judge the question.

In preparing a commemorative essay on the subject it is therefore, fortunately, not necessary to enter into an elaborate defence of the correctness of the main features of the Icelandic sagas as handed down to us in several well-authenticated manuscripts from the 14th century, corroborated as they are by a number of striking references, dating back to the middle of the 11th, to the testimony of the cautious and entirely disinterested Adam of Bremen.

The question now before the historian and antiquarian is not whether the hardy Norse sailors of the 11th century reached the American continent after having established themselves in its antechamber—Greenland. The question is how far south they proceeded, and whether or not they established a permanent settlement in any of the newly-discovered regions. The first of these points can only be settled in one of two ways. Either there must be discovered unmistakable archæological traces of the Norsemen of that remote period or the geographical hints and descriptions given in the sagas may be followed and a locality fixed upon, chiefly by a process of exclusion.

The former of these methods has repeatedly been employed, its climax having been reached in the well-meaning but exceedingly doubtful conjectures of Prof. E. N. Horsford. All attempts along this line thus far have, however, been fruitless of results, and the verdict of Prof. John Fiske, in his interesting monograph, "The Discovery of America," to the effect that "not a single vestige of

the Northmen's presence here at all worthy of credence has ever been found," can probably safely be subscribed to by friends as well as by enemies of the Norse claim.

It is different with the indications given in the sagas, although nothing like unanimity has as yet been established with regard to the conclusions drawn from them. The chief difficulty rests in the fact that these sagas give two somewhat conflicting versions of the story, one of which must be more genuine than the other. Most writers, like Anderson, De Costa, and Horsford, have failed to acknowledge this, although the last had access to two valuable treatises on the subject, viz.: Prof. G. Storm's "*Studies on the Vinland Voyages*" and Mr. A. M. Reeves' photographic reproduction of the manuscripts, with a careful English translation.

Of the two versions, the more recent—the one found in the so-called Flatoe-book, a manuscript compiled from older sources about 1387—was at first more generally known, and for a long time accepted as the best authority. It has, however, gradually been losing ground as a consequence of the severe criticism brought to bear upon it by Prof. Storm, and later by Mr. Reeves. According to this version, of which an excellent translation is given in Mr. Reeves' book, the real discoverer of Wineland was one Bjarni Herjulfson, who, about 987, accidentally drifted upon some unknown regions far to the southwest of Iceland, whence he was trying to cross over to Greenland. Some fifteen years later Leif, a son of Erik the Red, the earliest settler in Greenland, went to explore the unknown regions. He struck land to the south in three different places, calling them in succession Helluland (Flat-stone-land), Markland (Forestland), and Vinland (Wineland), the latitude of the latter being approximately determined by the observation that "the sun had both eykt-position and breakfast-position on the shortest day of winter."\* The saga then makes Leif's brother Thorvald undertake a separate expedition and explore the country to the west and northeast from the place in Wineland where Leif had had his winter quarters, next gives a curtailed and suspicious account of Thorfin Karlsefni's expedition—to be considered later—and finally makes Erik's natural daughter Freydis go there, accompanied by two brothers, Helgi and Finbogi. On this version Prof. Storm passes a very severe verdict. He points out that no mention whatever has been found elsewhere of Bjarni, whereas it is stated in at least half-a-dozen places that Leif Erikson discovered Wineland on a return trip from Norway. The saga places glaciers in Helluland,

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\* Sol hafði þar eyktarstað ok dagmálastað um skamdegi.

makes the grapes of Wineland ripen in winter, and employs a German with the strange name of Tyrker to discover them. Concerning the geography of Wineland the Professor says:

"It, on the whole, gives one the impression of a coast on the north, extending far to the east and west, and with several firths running in toward the south. One has to indulge in such an arbitrary construction of the sagas as did Prof. Rafn in order to make this description fit the coasts of North America. Weighing all that has been said, it will, I certainly think, be safest to treat the account of the Flatoe-book with the utmost circumspection. Whatever has its only origin there must be rejected, and whatever is found at variance with early traditions regarded as wanting historical foundation. The voyage of Bjarni ought, I think, to be dropped entirely to leave room for that of Leif Erikson."

A far more consistent and probable story is the one given in the Hauks-book, a manuscript of the very beginning of the 14th century—at any rate, not later than 1334—written by the learned Hauk Erlendson, a descendant of the chief explorer, Thorfin Karlsefni. According to this version, Wineland was discovered by the above-mentioned Leif Erikson. He had been on a visit to Norway, had met the famous Olaf Trygvason (who succeeded in converting him to Christianity), and in the summer or fall of the year 1000 was returning to his home in Greenland. He was, however, driven out of his course and came upon an unknown country. There were self-sown wheatfields and vines growing there, and also some trees called "mauser," of which he took some specimens with him. On his arrival in Greenland he reported his accident, and naturally awakened a lively interest in the new regions. Leif set about converting his relatives and neighbors to Christianity; but his brother Thorstein made an unsuccessful attempt to reach the strange country. A few years later one Thorfin Thordarson, called Karlsefni, an Icelander, who had recently arrived in Greenland and married Thorstein's widow, Gudrid, determined to make an effort to explore the unknown lands. Accompanied by Thorvald, another of the sons of Erik the Red, one Bjarni Grimolfson, and Thorhall, called the Huntsman, who was married to Erik's natural daughter Freydis, who went with her husband, he sailed with four vessels and one hundred and fifty followers to the western settlement and Bear Island, and thence bore away to the southward for two "doegr."\* They saw land before them,† "and found there large flat stones

\* The "doegr" represents a period of twelve hours. A good "doegra sail" seems, according to the best authorities, to have covered something like one hundred and eight miles.

† The quotations are from Mr. Reeves' book, but I have frequently compared his translation with the reproduction of the original manuscripts.

(hellur), many of them twelve ells wide. There were many Arctic foxes there. They gave a name to the country and called it Helluland. Then they sailed with west-northwesterly (or, as one version has it, northerly) winds for two 'doegr' and found a wooded country and many wild beasts. An island lay off the land to the south-east, and there they found a bear, and later called it Bear Island, but the mainland Markland (Forestland). When two more 'doegr' had elapsed they again discovered land and approached it; there was a cape there. The land lay upon the starboard; there were long strands and sandy banks there. They rowed to the land and found upon the cape the keel of a ship, and called it Kjalarnes (Keelness); they also called the strands Furdustrandir (Wonderstrands), because they were so long to sail by. Then the country became indented with bays, and they steered their ships into a bay."

The saga then relates how they lay by there, while two swift Gaels—Haki and Hekja—of their party were dispatched to the south to investigate the nature of the country. They staid away for three days, and returned with self-sown wheat and a bunch of grapes. "They went to their ships and proceeded on their voyage. They sailed into a bay. There was an island out at the mouth of the bay about which there were strong currents, wherefore they called it Straumey (Stream Isle). There were so many birds there that it was scarcely possible to step between the eggs. They sailed through the bay, and called it Straumfjord (Streamfirth), carried their cargoes ashore from the ships, and established themselves there. They had brought with them all kinds of live stock. It was a fine country there; there were mountains thereabouts."

After having related how they ran short of food in the rather severe winter there and captured a whale, the saga tells how Thorhall, dissatisfied with the outlook on the eastern coast, decided to retrace his course and round Kjalarnes in search of Wineland (not to "explore" it, as wrongly translated by many). He reached the cape, but was there met by westerly gales, and finally driven ashore in Ireland, where he lost his life, "according to that which traders have related." Karlsefni, however, cruised southward with Snorri and Bjarni and their people. "They sailed for a long time, and until they came at last to a river which flowed down from the land into a lake and so into the sea. There were great bars at the mouth of the river, so that it could only be entered at high flood-tide. Karlsefni and his men sailed into the mouth of the river and called it there Hop (a small land-locked bay). They found self-sown wheatfields on the land; wherever there were hol-



lows and wherever there was hilly ground there were vines. Every brook was full of fish. They dug pits on the shore where the tide rose highest, and when the tide fell there were halibut in the pits. There were great numbers of wild animals in the woods. They remained there half a month and enjoyed themselves and kept no watch. They had their live stock with them."

Then one morning a great number of men in skin canoes came paddling toward them and went ashore, staring curiously at the strangers. "They were swarthy men and ill-looking, and the hair of their heads was ugly; they had large eyes and broad cheeks." After a little while they rowed away to the southward around the cape. Karlsefni and his men now built huts above the lake and prepared to stay there that winter. "No snow came there and all of their live stock lived by grazing." In the spring the natives again appeared and began to trade with the foreigners, but finally, distrusting their intentions, took to the warpath, killing two of their number. Although Karlsefni succeeded in beating them back with heavy loss, he now determined to leave this dangerous neighborhood and return to Streamfirth, where the party arrived after a couple of unimportant incidents. The narrator here cautiously remarks that some say that Bjarni and Freydis had remained here (all the time) with a hundred men, while only Karlsefni and Snorri had proceeded to the southward with forty men, tarrying at Hop barely two months and returning again the same summer.

"Karlsefni then set out with one ship in search of Thorhall the Huntsman, but the greater part of the company remained behind. They sailed to the northward around Keelness, and then\* bore to the westward, having land to the larboard. The country there was a wooded wilderness as far as they could see, with scarcely an open space, and when they had journeyed a considerable distance a river flowed down from the east toward the west. They sailed into the mouth of the river and lay to by the southern bank." After having told how one morning they discovered what seemed to be a uniped, and that Thorvald, another son of Erik the Red, was shot by him, the saga goes on to tell how they sailed away back toward *the north* [the direction is plainly stated], and believed they had got sight of the unipeds. They concluded that the mountains of Hop and those which they had now found were the same, "and this appeared to be so, because they were about an equal

\* "Ok berr thá fyrir vestan fram" can also be translated; "and then proceeded [southward] on the western coast," this being clearly the opinion of the author, as shown later.

distance removed from Streamfirth both ways." They sailed back and passed the third winter at Streamfirth. In the spring, however, they decided to return to Greenland. "When they sailed across from Wineland they had a southerly wind, and so came upon Markland, where they found five skrellings—one man, two women and two children. They captured the boys, but the others escaped and 'sank into the earth.'" These boys they took with them arrived safely in Greenland (there is no mention here of Helluland), and remained during the winter with Erik the Red.

The above is, in the words of Prof. Fiske, "a sober, straightforward and eminently probable story." He points out how it would hardly occur to European fancy to invent such a thing as self-sown wheat. He is, however, undoubtedly wrong in thinking it was Indian corn, because a plant so strikingly unlike anything with which these Icelanders were familiar would surely have been described by them in other terms.\* He calls attention to the fact that savages were practically unknown to Europeans before the 15th century, that they knew nothing whatever about peoples who would show surprise at the sight of an iron tool, or terror at the voice of a bull, or who would eagerly trade off valuable property for worthless trinkets—incidents which, for want of space, could not be quoted in the preceding summary. He thinks that the description of the skrellings (inferior people), with their "swarthy hue, ferocious aspect, ugly hair, big eyes and broad cheeks," will do very well for Indians, the "big eyes" probably referring to the eye-sockets, as suggested by Prof. Storm. The expression skin-boats, of course, rather points to the kayaks of the Eskimo than to the Indian canoe. This inaccuracy can, however, be accounted for on the ground that the explorers failed to examine the material of the boats, and simply inferred that, as a matter of course, they must be made of skin, since they were not wooden keel-boats. They may, furthermore, have had an opportunity of examining a boat in Markland, where the inhabitants met with, living in caves, probably were Eskimos. In the "flat stone," Prof. Fiske, with good reason, recognizes the familiar tomahawk, and in the big ball, raised upon the end of a pole, the "demon's head"—according to Mr. Schoolcraft, commonly used among the Algonquins in exactly

\* The first to point out that the self-sown wheat of the sagas in all probability was wild rice (*Zizania aquatica*) was, I believe, Prof. Schubeler, of the University of Christiania. His theory has been accepted by Prof. Storm and Mr. Reeves. In Vol. 9 of the *American Anthropologist*, Mr. G. C. Stickney has an interesting article on the Indian use of wild rice, the "folles avoines" of early French explorers.

the manner described in the saga. He concludes by saying: "Throughout the account it seems to me perfectly clear that we are dealing with Indians."

Before attempting to reach some opinion with regard to the locality of Wineland, it will now be necessary to devote a little additional attention to the relative merits of the two sagas. Personally I believe, with Prof. Storm, that the older Hauks-book, a manuscript written by a descendant of Karlsefni, Hauk Erlendson, tells by far the best-authenticated and consistent story. It is a narrative that was preserved, we may be sure, with great faithfulness and care in the family of Thorfin, the true explorer of the country, among whose descendants were counted three bishops and many other prominent men. It was inherited from father to son for some three generations and probably reduced to writing in the first part of the 12th century, getting its present shape some 150 years later at the hands of the learned Hauk. Being a family history, it is, of course, possible that these descendants, including the last editor, consciously or unconsciously dragged into the story of Thorfin's expedition incidents that did not belong there, and more especially laid hold of the expeditions of Thorvald and Freydis in order to make their ancestor the first and only explorer of the country. The saga, however, does not show any tendency to magnify the personal qualities of Thorfin; he nowhere plays the role of a mythical hero or plumed knight, but the story is in the main plain and probable.

Turning to the version of the Flatœ-book, it presents, as pointed out by Prof. Storm and Mr. Reeves, a great number of weak points. It is evidently founded on narratives preserved in the family of Erik the Red—a somewhat problematical character—and the bragging tone and many fanciful incidents related stand in a marked contrast to the sober tale of Hauk. The final compiler or some predecessor did not, it seems, like the inconspicuous role played by Leif and his family in the exploration of the country, or perhaps had somehow really got the mistaken idea that Leif went to Wineland from Greenland. He, therefore, borrowed incidents and descriptions from the story of Thorfin, constructed Tyrker in analogy with Haki and Hekja, and made Leif erect his booths near a lake from which a river went out into the sea. It then became necessary to make somebody else discover the country explored by Leif. The saga of Thorfin mentioned one Bjarni Grimolfson; and another man, Herjulf, probably was among Erik's early followers. This may have given the clue to the story of Bjarni Herjulfson, mentioned absolutely nowhere else. Thinking that Leif's brother, Thorhall,

played too small a part in the story, by only accompanying Thorfin, he next made him undertake a separate expedition and supply the keel for Kjalarnes. It then became necessary to reduce Thorfin's followers from 150 to 60 and to curtail his story in various ways. Finally, an incident related of the stalwart Freydis and the short mention of some quarrels caused by the women during the last winter in Straumfjord sets somebody's imagination working till we get a gruesome tale of her separate expedition to Wineland in company with the brothers Helgi and Finbogi. This may seem to be a hazardous conjecture, but it is substantially the view adopted by Prof. Storm and Mr. Reeves, and the only way out of it is to regard the saga of Thorfin as the result of a similar process.

But even the saga of Thorfin cannot evidently be treated as a modern description of travel. No extensive report of the expedition could have been committed to writing before the beginning of the 12th century.\*

Ari Frodi, the Father of Icelandic historiography, lived then, and in his abridged *Islendinga-book* makes a short but significant reference to Wineland and the Skrellings, claiming the authority of his uncle, Thorkel Gellison, who in his turn said he had it from a follower of Erik the Red. A larger "*Book of the Icelanders*," by Ari, is known to have existed, and may have given a somewhat extended account of the discovery; but even this is conjecture.

Bearing this clearly in mind, we are bound to admit that certain details were in the nature of things more liable to be corrupted than others during those more than a hundred years of oral tradition; though the memory of those early Norse saga-narrators surely was wonderful. Among such details, naturally, are the number of "doegr" consumed in sailing between the different regions visited. This number is in Hauks-book uniformly placed at two, which is in itself suspicious. Mr. Reeves points out the similarity between p(-thvau, two) vau and siau (seven), and suggests that the latter had been given in an earlier manuscript in the first of the places where two occurs. Prof. Storm calls attention to the fact that the saga-narrator evidently placed Kjalarnes in the latitude of Ireland, where we find it on the map of Stephanius (1570). And as it took six "doegr" to sail from Iceland to Ireland, he probably wrongly concluded that the voyage from Bjarney to Kjalarnes was accomplished in the same length of time. It is also significant in this connection that the Flatoe-book gives two, three and four "doegr" for the different dis-

\* There are very insufficient grounds indeed for the statement of Fiske that it may have been committed to writing already in the middle of the 11th century.

tances traversed by Bjarni Herjulfson. Somewhat less liable to be misrepresented would be the shape of the country and the approximate direction of the winds used in reaching it, while the nature of the climate, the products of the country, and the descriptions of the peoples met with would naturally cling more tenaciously to the memory, although unusual traits were apt to be somewhat exaggerated. The self-sown grain and the vine, mentioned by Adam of Bremen, the vine being furthermore incorporated in the name of the New Country, as referred to by Ari Frodi, must be the main pivot on which our research turns, and would alone seem sufficient to refute any theory placing Wineland somewhere on the Labrador coast or in Newfoundland, not to speak of the impossible theory of Mr. J. P. McLean and others, who even suggest the Northwestern regions of Greenland.

Another observation that would easily cling to the memory is the one referring to the length of day in Wineland, and although not recorded in the earliest manuscript, it certainly makes a genuine impression. This is not the place to enter into an elaborate discussion of the true significance of the term "eyktarstadr." I can only say that I subscribe entirely to Mr. Reeves' opinion that the question has been finally solved by Prof. Storm. I am familiar with the use of the word "eykt" (mod. Ökt.) in three widely-separated regions of Norway. It signifies everywhere at the present date the interval of time between the meals (an addition, from *auka*, to add), and in some places, as also evidently in Iceland in those early days, developed the secondary meaning of the end of the particular eykt, terminating in most places at four o'clock, in some localities as early as 3 or 3.30, but very rarely as late as 4.30. The second part of the compound, however, points to a kind of sundial and octant, well known among the ancient Norwegians, and to the position of the sun in the horizon. "Eykt" in this sense is clearly defined in a paragraph in the ancient law-code "*Gǫrgás*," and the expression used in the account of Leif would place the latitude recorded not farther north than 49°-50'. For it merely stated that the sun "had" or reached this point of the octant, whereby it is not denied that it may have passed somewhat farther. Prof. Horsford's explanation of this sentence is on a par with the rest of his exceedingly unscientific treatment of the subject.

The description of Wineland as given in the Flatöe-book version did not give us any clue to its location. Let us now try with the one in Hauks-book. A prominent ness (Keelness) jutting out towards the north; a long sandy beach, a firth, one of the many, with an

island outside of it and marked tides running in and out (Straumfjord); a considerable distance farther south a river flowing out of a lake in a rather mountainous country (Hop); and retracing our steps to the southwest of Keelness, about as far from Straumfjord as was Hop on the eastern side, a river flowing from the east toward the west from mountains which were judged to be identical with those in Hop on that very account. Where on the American coast can anything like it be found? It is only too plain that the region around Boston does not fit the description at all. In order to make it at all probable that the Boston region was meant Prof. Horsford had to chop up the saga of Thorfin\* in a most uncalled-for and pitiless manner; and the worst of the matter is that he could not even then make his case good. While it is evident from the context of the saga that Thorfin, on his return from Hop, when searching for Thorhal, sailed to the southwest after having rounded Kjalarnes, proceeding till he came to a river that flowed from the east toward the west, at the mouth of which he lay by, Prof. Horsford succeeds in making himself believe that this applies wonderfully well to the Charles River, which flows in that direction for a little distance between Cambridge cemetery and Warren bridge (p. 79). This is assuredly giving us stones for bread. The same wonderful brand of logic makes Thorvald (p. 68) explore the same river, when it is stated in the saga that "they proceeded along the western coast" from Leif's booths. It is only eclipsed by the ease with which he makes him return to Gurnet from Cape Cod (his Keelness), when the saga expressly states that "they sailed away thence to the eastward."

The case stands somewhat better with those that follow the suggestion of Prof. Rafn, and place Wineland, and more especially Hop, somewhere in Rhode Island. Cape Cod being the only place in New England that to some extent answers the requirements of Kjalarnes, Hop must, as a matter of course, lie farther to the south; and as far as this goes any river on the New England coast flowing out from a lake near by would help us out. If we only had to consider the location, Monomy (Horsford) would do fairly well for Straumey, and for several reasons better than one of the islands outside of Buzzard's Bay (Rafn and others). There is, however, not the slightest indication that the explorers sailed straight west from Straumey, the saga on the contrary using the terms "southward" and on returning "northward." And how explain the fact that

\* In "The Landfall of Leif Erikson." It is difficult to believe that this vandalism can have been committed in good faith.



Thorfin, after rounding Keelness, proceeded westward and southward till he came to a river that flowed from the east towards the west? There is no such river on the Cape Cod peninsula. Again, what of the mountains which they found there and judged to be identical with those in Hop, because they had now proceeded about as far on the western side of an island or peninsula as they previously had on the eastern? + x x

Mr. L. G. Power, in Vol. 8 of the New England Magazine, sticking tenaciously to the small number of "doegr" consumed in sailing from Bjarney, which he wrongly identifies with Disco, to the Kjalarnes of Wineland, tries to show that the latter point may be identical with Cape Chudley, the George River emptying into the Ungava Bay being the river mentioned, flowing from the east towards the west. This would look quite plausible as far as the shape of the coast is concerned, although the correct interpretation of the language of the saga, as given in the best manuscript, requires the same mountains for both regions east and west and not merely widely different parts of the same chain. And what of the vine, the self-sown grain, and the mild winters, not to speak of the statement regarding the more southern latitude? The whole theory breaks down at the slightest touch of criticism. It can easily be proved that this Bjarney could not have been Disco, any more than one of the islands on the Cumberland coast, suggested by Mr. J. T. Smith. + x x

In the *Proceedings*, Royal Society of Canada, 1898, Bishop M. F. Howley advocates a new theory, placing Helluland near Point Riche, Newfoundland, where are found some remarkable flat stones, Markland in one of the Magdalen islands, and Wineland around Miramichi Bay. This is again a case of sacrificing the whole for the part. It is completely at variance with the text of the sagas to look for Helluland at the western coast of an island. Markland is, according to the best version, situated to the southeast. And, finally, the description of Kjalarnes, Wonderstrands, Straumey, and the distant Hop far to the south is entirely misleading if we select the coast of New Brunswick.

But there is such a peninsula as the one described in the saga on the eastern coast of North America. Supposing that Thorfin and his men sailed from an island near Fiskerfjord, in the Western Settlement, as thinks Prof. Storm, they would then most probably first strike some part of Labrador. Finding it extremely uninviting, they again made for the open sea, with a west-northwesterly wind, and next struck either the northeastern coast of Labrador,

\* \* 2<sup>d</sup> Series Vol. 4 Meeting of May 1898 Section II pp. 77-102.

+ N.E. Magazine - The Whereabouts of Vinland

Vol 13 = N.S. Vol 7 Oct 1892 pp 174-192

xxx Cf E.F. Gray - Leif Eriksson, Discoverer of America  
4201 NK 1930 pp 132 ff. Chase Gander Creek flows from east to west.

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opposite Newfoundland—which latter, or more probably Belle Isle, then would be the island mentioned—or some part of Newfoundland farther east. They then proceeded along the coast of Labrador, and finally set straight south, or along the coast of Newfoundland, rounding Cape Race and steering west-southwest, keeping the southern shore in sight for a long time.\* In either case they could very easily strike Capes North, Egmont, or Breton. Prof. Storm suggests Cape Breton; but if we stick to the description of the sagas, I venture to think that Cape North or Cape Egmont meets the requirements of the case better, although less easily stumbled over from Newfoundland. If we select Cape North, Wonderstrands would be the long, comparatively unindented, partly sandy coast-line between that cape and St. Ann's Bay. The Firth, into which they stood, need not have been the very first met with. It might have been Mira Bay, outside of which is Scatari Island, that to all appearances could do very well for Straumey. Not finding the climate or natural conditions of the country up to their expectations, it is now conceivable that Thorhal wished to sail northward again and look for Wineland, on the western shore, of which they had evidently caught a glimpse in approaching Capes North and Egmont.

Karlsefni, however, proceeded southward for a long time, finally lying by at the mouth of a river that flowed out of a lake and could not be entered with their craft, drawing some seven feet of water, except at flood-tide. There are many small rivers in Nova Scotia between the Gut of Canso, which the explorers naturally regarded as a firth, and the southern extremity of the peninsula, that will meet the requirements; but if I am correct in placing Streamfirth as far north as Mira Bay, Hop (the true Wineland) could not very well have been farther south than Halifax.

Retracing his course, Karlsefni and his men then rounded Cape North in search of Thorhall, proceeding along the western shore for a considerable distance, finally stopping at one of the rivers flowing there from the east towards the west, coming from mountains which they judged to be identical with those seen in Hop. If they were approximately correct in this surmise, they must have passed the St. George's Bay, and stopped at one of the small rivers flowing out in the Northumberland Strait, east of Merigomish Harbour, the divide of Guysborough and Halifax being the mountains mentioned. Directly opposite Merigomish Harbour is St. Mary's Bay; but being much nearer to Mira Bay (Streamfirth), we are no

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\* The exact direction of the wind is not mentioned in this case.

doubt justified in placing Hop farther south. On leaving the country for good they again struck Labrador or Newfoundland, and then seem to have set sail directly for the Eastern Settlement.

Turning now to the other features of Nova Scotia, its latitude is sufficiently different from that of Greenland to arrest the attention of the explorers. There is little difficulty about the wild rice and vine, especially the latter, which was found there in abundance some five hundred years later by Jacques Cartier and others, and still is here and there met with, if not in a sufficient quantity, to justify the statements of the Hauks-book. It is true that the winter in Hop is described as snowless. But taken literally, this would point to a more southern latitude than anybody has yet ventured to claim for Wineland, and we may be well justified in regarding this as a slight exaggeration, reasonably accounted for by their comparing the climate with that of Greenland and Iceland.

The only weak point in the theory of Prof. Storm, and less so in the one here advocated by myself, is, in my opinion, the rather unfrequent occurrence of sandy shores between Cape North and the Gut of Canso. As a matter of fact, however, there is in the Ingonish Bay, which is wide and open, a sandy beach of considerable length—at least one mile. For this I have the very best authority—viz., a letter from the Director of the Geological Survey of Canada—and this would, according to my view, be the identical place where the explorers lay by while waiting for the return of the Scotch messengers—an incident that has given the advocates of the barren Cape Cod peninsula any amount of trouble. It is, therefore, extremely probable that the explorers expressly mentioned this sandy beach when relating their story in Greenland and Iceland, and the first historian that committed the account to writing was not far off the mark when he wrote that “there were long shores and stretches of sandy beach there.”

We must, furthermore, remember that the name given to this shore is our most reliable clue to its whereabouts, and that “Furdu-strandir” has nothing whatever to do with sand. It is true that “furtha” in Icelandic meant “a wonder,” but as a qualifying term “furthu” generally must be rendered by “wonderfully big or extensive,” and the most correct translation of the name in question is the “wonderfully extensive strands.” That this is the true explanation is also evident from the statement of the saga itself, that these shores received that name “because they were so long to sail by.” And in this respect the 60 miles long, almost entirely

unindented, coast-line from Cape North to St. Mary's Bay can well stand comparison with the much shorter Cape Cod peninsula.

And then we have another piece of evidence that more than counterbalances the sandy shores of Cape Cod. According to De Costa, wild grapes are even to-day growing there among the shrubs, within the very reach of the ocean spray. But if that is the case, why did Thorfin dispatch two messengers to the south to search for an article which must have been there in abundance, right under his eyes? And why did they not even discover any grapes in Straumey, as plainly shown in the saga, if this was identical with Monomy or Martha's Vineyard? This extremely important fact has, singularly enough, been overlooked by everybody; and yet it is worth more than all the bushels of sand that have blinded the eyes of Prof. Horsford and other uncritical defenders of an untenable theory. It is self-evident that Thorhal the Huntsman need not have despaired of finding Wineland on the eastern coast if he had already reached Martha's Vineyard. But we may forgive him if he spoke contemptuously of the lack of wine and the other unpromising features of Scatari Island.

As regards Markland, it seems clear to me that there is no serious objection to placing it in the southern part of Labrador. We must remember in this connection that the explorers came from almost entirely treeless regions, and were apt to be satisfied and even surprised at the first sight of a comparatively insignificant patch of real forest land. And, as a matter of fact, the Labrador coast is by no means everywhere the barren, sterile affair that most people imagine.

In the third edition of the *Newfoundland and Labrador Pilot*, 1897, we read that St. Lewis Inlet, situated only a short distance north of Belle Isle—the very region where, in my opinion, the explorers may have landed the second time—can boast of a fine forest vegetation at the very mouth of the bay. An island inside, even, has the significant name Wood Island, and in the bottom of the inlet the trees are large enough to be used by the Newfoundlanders for their schooners and boats. This region, then, decidedly deserved to be christened Markland. As for the sand, our troublesome friend from Wineland, there is no such thing attributed to Markland in the best manuscript. And, if it should come to a pinch, the explorers need only have followed the coast to Pinware Bay, where, according to the *Pilot*, a fine sandy beach would have greeted their eyes. That something like this was the case seems more than probable, when we remember that nothing in the saga speaks

against it, and that their errand was to explore countries that had already been, to some extent, located.

With regard to Helluland only a few remarks need be added. Every person familiar with Old Norse, as well as modern Norwegian and Icelandic, will know that the name must refer to loose, flat stones, as stated in the Hauks-book, and not to a single flat rock, as wrongly given in the Flatoe-book. And he will only pity Prof. Horsford, who naively reproduces a picture from the east coast of Newfoundland, in which the ruffled rocks depicted have no more resemblance with "hellur" than with the man in the moon. But pity will be mingled with astonishment when he reads that the icebergs floating in the distance are the inland glaciers described in the last-named saga as forming the border of the rock. Surely this kind of historical research needs a strong money-backing to get into print. That some real good-sized "hellur" are to be found somewhere on the vast Labrador coast must, with our present knowledge of the country, seem altogether too probable. Both the Arctic foxes of the only reliable saga and the glaciers of the Flatoe-book decidedly point to a high latitude, not to speak of the fact that the region presumably was entirely treeless.

I must, therefore, maintain that the Nova Scotia theory, on the whole, offers by far the fewest difficulties, and I am unable to see any good reason why we should rather select Cape Cod. The only justification for doing so must certainly be positive archæological evidence. This has, as already mentioned, failed to appear, in spite of the praiseworthy efforts of those who have so earnestly sought it. If I am not mistaken, very few competent archæologists or historians take Prof. Horsford's extremely uncritical philological deductions or his Norse ruins seriously. His etymological speculations on Norumbega, Cape Carenas, and America are more than sufficient to put any person possessing a philological training on his guard. The first-mentioned of these names, employed on some of the earliest maps to designate a region south of the St. Lawrence, may with the utmost confidence be said to have as little to do with Norway (mod. Norwegian "Norge" about year 1,000, and later "Noregr.") as with Watertown on the Charles.

I am, however, inclined to think that Mr. Weise was equally wrong in connecting it with the Palisades of the Hudson, explaining the word as a corruption of "Anormée Berge," the "great scarp." Space forbids my taking up this difficult subject here; but in my opinion the earliest form of the word "Noranbega" stands for Normanbega, the latter part of the compound being, as already

suggested by De Costa, the Spanish "vega," meaning a "plain at the mouth of a river." The name seems, as every historian knows, to date from Verrazano, whose expedition started from Normandy, in France. It is first found in a map ascribed to his brother, and there evidently corresponds to the "Normanvilla," given on the five years' older Majollo map, also founded on Verrazano's expedition. My explanation is that the said brother, knowing that no town had been found on the entire coast, changed "villa" to "vega"—a term then current on Spanish maps. The first letters of the word as given by him are in fact illegible, and the "r" in . . . ranbega, commonly read out of it, may be part of an "m." Later this letter was dropped for reasons that need not here be stated, and the other forms, like "Nuremberg" and "Norvega," are easily explained as the product of ignorance and a false interpretation. The theory propounded by Beauvois and others, placing a permanent Norse settlement somewhere in Nova Scotia or New Brunswick, not to speak of New England, is only supported by the slenderest thread of evidence, while the entire Old-Icelandic literature, as a matter of fact, goes directly against it. And even if such a settlement was effectuated, the chances are a hundred to one that it would not have received the name of "Noreg" or "Nordanviga."

Still more fanciful is the derivation of Cape Carenas, which probably did not even designate Cape Cod on an early map. It tries the patience of a philologist sorely to find Carenas on Lok's map through Coaranes or Merriam's traced back to Kjolrnes, Kjalarnes, "probably learned from natives, the offspring of mixed parentage" (p. 12). We have, of course, to do with the Italian or Spanish *Carenas* (Lat. *Carinæ*, French *Carènes*), which means Keels, and evidently refers to the shape of the cape.

This does not refute the theory that the Norsemen struck the identical cape and gave it the name of Kjalarnes for the same reason. But it is certainly enough to prove that no connection was at all necessary between those two events.

Of the derivation of America from Erik the Red through the intermediate forms of Ereka, Emereka, Mr. McLean pointedly says: "This method of treating philology is enough to cause the bones of Sir William Jones to turn in their grave."

The few specimens of the testimony to be derived from names of places as introduced by Prof. Horsford will probably suffice for most readers. After considering them, one does not feel surprised at all in noticing the ease with which he pointed out a Norwegian

fish-pit here and a building site there, not to speak of shoals, islands, capes, and landing-places. But we cannot help feeling that the corroborative evidence of an eye-witness less apt to be carried away by his enthusiasm would be very desirable. I understand that Miss Cornelia Horsford is still working on the same lines, and hope that after all some valuable piece of evidence may be forthcoming.\* It is now the only means by which thoughtful students of the sagas can be brought to change their conviction that the Norse explorers most probably never passed the southern extremity of Nova Scotia.

As pointed out by many, the chances are, however, very small that anything will be found, for the simple reason that the Norsemen, as already mentioned, evidently failed to effect a settlement of the country. The sagas do not contain a single statement from which to draw the opposite conclusion, and Prof. Fiske justly lays stress on the fact that no descendants of European domestic animals were ever met with in North America 500 years later. The only structures erected by the explorers, probably, were the dwellings of Thorfin, possibly wooden frame houses (budir, booths) resting on corner-stones or wooden blocks, for which it would be vain to look at this late date. The fish-pits dug in the sand would not, under favorable circumstances, last for fifty years, and the palisades would rot down long before the advent of the 19th century. An axe or sword-blade might be found, it is true; but until some such relic is produced we shall be justified in expecting it to turn up in Nova Scotia rather than in New England, however fervently our patriotism may desire the latter alternative.

Space forbids my consideration of the historic importance of this early discovery of the New World and its relation to that of Columbus. Even most Norwegians have of late little patience with the childish exaggerations of Miss Mary Brown, now Mrs. Shipley, and the efforts to belittle the deed of the Genoese explorer; and they look upon the feat of the Norsemen as one of those interesting premature exertions of which history records so many. The Leif Erikson Monument Society of Chicago, which has been striving hard to erect a monument for Leif in 1900, did not succeed in raising the necessary funds in time. The excellent Norwegian sculptor, Mr. Sigvald Asbjornsen, is, however, at present hard at work with

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\* Her article in the December number, 1899, of the Popular Science Monthly, did not, so far as I can see, add anything of interest to the solution of the question. She most uncritically accepts her father's view of the sagas, and the sober statements of Mr. Erlingsson and Dr. Gudmundsson, appended to her article, seem completely to dispose of the alleged Norse ruins discovered.

the elaboration of a splendid model which has received the unanimous approval of an art committee. The statue is to be unveiled next spring. It is sure to be a fitting celebration of the final admittance into the text-books of this country of a much-abused historical fact.

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## THE SIEGE IN PEKING : ITS CAUSES AND CONSEQUENCES.

AN ADDRESS BY

DR. W. A. P. MARTIN.

MR. PRESIDENT AND GENTLEMEN OF THE GEOGRAPHICAL SOCIETY:

You have asked me to give you some account of the siege in Peking, together with the causes that led up to it, and its probable outcome. No proper view of the thrilling events which have there taken place can be given without first touching upon the *geographical situation*. Man is moulded by his environment, and it would not be difficult to show how the character of the Chinese—physical, moral, and intellectual—has been formed by the geography of their country. Of England a well-known poet, after satirizing the villainous climate of his country, exclaims:

“Tis thus, with rigor for his good designed,  
She rears her favorite man of all mankind.”

A Chinese philosopher would unquestionably adopt without objection every word of the English poet, and he would lay special emphasis on the phrase, “Her favorite man of all mankind.” He reads in the ancient books of his own country a tradition that man was made, not of dust but clay, the clay being of different colors. The Chinese were made first, and of yellow clay, hence they gave themselves the flattering designation of “Men of Gold.” That title we find to have been a common one amongst the Tartars of the north. In the eleventh and twelfth centuries a large part of northern China was subject to a body of Tartars, who bore the tribal name of “Golden Horde.” The present rulers of China, called Manchus, claim them for their remote ancestors, and continue to wear the same title of “Golden Horde”—in the Manchu language “*Aischin Gioro*.” Having referred to the Tartars, I would like to have you observe that their relations to the Chinese from time immemorial have been very similar to those of the Shepherd Kings to the rich inhabitants of the Nile Valley. The Chinese depended upon agriculture, while the wandering nomads of the northern plains subsisted on their flocks and herds without settled homes. They were always ready to make incursions into the bordering provinces of China, and oftentimes succeeded in effecting the conquest of a portion, or the whole, of the Chinese Empire. It is

startling to discover that one or other of these northern tribes, Mongol or Manchu, has exercised the mastery over China for seven hundred out of the last fifteen hundred years; nor are the troubles caused by them limited to seven centuries, for the Great Wall, so huge as to form a geographical feature on the surface of the globe, attests a perennial conflict between Tartar and Chinese, for it was erected two hundred and forty years before the Christian era for the express purpose of keeping the Tartars out. That such a conflict should exist from generation to generation is no matter of surprise. Schiller tells us that it began not far from the Garden of Eden, and has been handed down from Cain and Abel to the present time. His version of the Bible story is that Abol's sheep trespassed on the cornfields of his brother Cain.

A Chinese historian says of the Great Wall: "It required so much labor for its construction that it was the ruin of one generation, but it was the salvation of all that followed." To me this appears to be an over-estimate of its benefits; for while it has undoubtedly served the purpose of a barrier against small bodies of marauders, it has never sufficed to restrain great armies like those of Genghis Khan. The Manchus, who for two hundred and fifty-six years have held the throne in Peking, were not under the necessity of forcing their way across this international barrier, but had its gates thrown wide open for them by a Chinese General, Wu San Kwei. He invited their assistance to suppress a body of rebels who had got possession of the Capital, and to take revenge for the crimes committed by them—an errand very similar to that of the eight Powers now in occupation of China. The rebels were easily put to flight, but when the General offered to pay off his Tartar allies and invited them to retire to the north of the Great Wall they respectfully declined to do so. An old fable tells us that an ass, in danger of being driven from his pasture grounds by a horned stag, invited a primitive man to mount on his back and drive away his enemy. When the stag was put to flight, he asked the man to dismount; but he was an ass to imagine that the man would comply with his wishes. China finds herself in the same predicament to-day. Instead of the Manchu Tartars, ranged curiously enough under eight banners, she finds herself completely under the power of the eight mightiest nations of the globe. They are in the saddle, with their bit in the ass's mouth, and though that noble beast, like that of the ancient prophet, speaks with human voice, and utters an energetic protest, it remains to be seen whether some of these eight nations will not persist in keeping their place in the saddle.

The fact that China is, and has been, under foreign domination for two centuries and a half is essential to the comprehension of that astounding movement which has so engrossed the attention of the world. The cooping up of eleven Legations in the capital of China, together with a war of extermination on all foreigners, and foreign interests of every description, whether mercantile or missionary, calls for explanation. What motives, we are asked, could prove themselves so potent in their effect on all classes in that Empire as to bring about combined action of high and low for the expulsion of foreigners? I answer that there are three motives which, taken in connection with the circumstances of the age, appear to me to be sufficient to account for the phenomenon. They are, first, political jealousy; second, religious antipathy, and last, but not least, industrial competition. These have operated in different proportions on different classes, while in some instances all three have combined to produce their effect on the mind of one class. The existence of political jealousy is inseparable from a foreign domination.

The Manchu dynasty, though it has produced many able rulers, has never been free from the influence of that kind of jealousy. The Manchus have always feared, since the dawn of commercial intercourse with the great nations of the West, that some of those nations would endeavor to supplant them in the occupation of China. They have accordingly been suspicious of everything, whether commerce, missionary enterprise, or railways and mines, which tended to increase the prestige of foreigners. Some of these undertakings they have looked upon as a pre-emption claim on their territory; others as a settled scheme for winning away the hearts of their people. You will naturally infer that they have never shown themselves, with one exception, which I shall presently mention, very solicitous for the intellectual enlightenment of their Chinese subjects. The old philosopher, Laotse, lays down as a maxim for easy government—in satire, no doubt—that it is only necessary to fill the people's bellies and to empty their skulls. On this the present rulers of China—I mean the Empress Dowager and her clique—are acting in the suppression of schools, the interdiction of newspapers, and the attempted extirpation of Christian Missions. The exception referred to is a remarkable one. It is the young Emperor, Kwang Su, who is in no degree responsible for hostilities with foreign Powers, but is rather to be regarded as the first victim on a long and sanguinary list. Nephew of the Empress Dowager, he was adopted by her at the age of three. With a view

to preparing him for his great destiny, he was provided with numerous instructors, two of whom were my own students. Their duty was to induct His Majesty into a knowledge of the English language, and in order to be sure that the lessons which they set for him were correct, they always submitted them to me for approval. I shall not affirm, therefore, that I am entirely innocent of having exerted some influence to bias the mind of the young Emperor.

It is impossible that he should have studied English without becoming infected with progressive ideas. Still, the blame, or the honor, of having perverted the mind of the "illustrious successor" (as his name signifies) belongs to Kang Yu Wei more than to any one else. This patriotic scholar perceived the necessity of reforming the educational system of China in order to secure the permanent independence of his country. He got the ear of the Emperor, and of that young man it is no little praise to say that he possessed the intellectual capacity to comprehend the ideas of the bold reformer and the strength of will to resolve on carrying them into effect. He issued decree after decree, with startling rapidity, setting aside the effete system of essays and sonnets in civil service examinations in favor of the sciences and practical arts of the modern world. In order to prepare students for these new tests, a system of common schools was to be established, Taoist, Buddhist, and Confucian temples being placed at their disposal. Middle schools were to be established in all the districts, and colleges in the several provinces, with a new University in the capital for the graduates of provincial institutions and for the sons of the nobility. Nor did His Majesty stop with educational reform. He diligently sought to prune away the dead branches of the tree in order to increase the quantity and improve the quality of its fruit. Sinecures in the Mandarinate were abolished, and new bureaux established, such as those for commerce, mining, and agriculture. More than all, he resolved to confer on his people the priceless boon of free speech, ordaining that even junior officials should have the privilege of addressing the Throne without let or hindrance. This was the rock on which his noble scheme of reform was shattered. A young man, a doctor in the Han Lin, who was well known to me, though a junior member in the Board of Rites, drew up a memorial proposing numerous changes in the administration of the Government. His chiefs, all old men, and mostly Tartars, refused to transmit the document to the Throne. The Emperor, on learning that they had dared to intervene between him and his officials, flew into a towering rage, stripped them of their official honors, and threatened to dismiss

them from the public service. Those old men, smarting under the disgrace, posted away to the Country Palace, and threw themselves at the feet of the Empress Dowager, begging her to come out of her retirement and save the Empire from the hands of a young man who was driving the chariot of State so furiously that there was danger of his setting the world on fire. She had been Regent twice before, but she had never retired altogether from the world of politics. With her neither card parties, nor novels, nor theatrical shows, could compete in interest with the political chess-board; in all moves on that board her fingers had been more or less concerned. Eagerly did she embrace the invitation, and as with a bolt out of the blue she struck down the impetuous youth, compelling him to sign a paper begging her to teach him how to govern. By way of justifying her action, she issued an edict, in which, amongst other things, she said that her subjects must not suppose that she was opposed to rational progress. It does not follow, she said, that we should stop eating because we have been choked. She meant to say that her adopted son had crammed his reforms down the throats of his people too fast for their digestion. She intended to administer them with judicious moderation, in such quantity and degree as would make them easier of assimilation. Well had it been for her and her dynasty had she adhered to this principle; on the contrary, throwing herself into the hands of a reactionary party, instead of progress she entered upon an anti-foreign reaction, in which a disastrous smash-up became inevitable. She began by cancelling all the educational and other administrative reforms inaugurated by the young Emperor.

The only one of the institutions established by him which she permitted to remain was the new University. That institution she no doubt spared because it had been favored or, as one might say, founded by Li Hung Chang, who, by the way, though he still continues to be her faithful servant, has behind him a record of imperishable glory as the foremost patron of the new education in the Chinese Empire. It was he who recommended me for the Presidency of the University, which I may describe as at present in a state of suspended animation, the Russians having seized on the buildings for soldiers' barracks and threatened to confiscate its funds, which were deposited in Russian banks.

A little before the *coup d'état* Germany had seized a seaport by way of reprisal for the murder of two of her missionaries in the south of Shantung. Russia demanded the cession of Port Arthur as an offset. England insisted on having Wei Hai Wei, on the

opposite side of the Gulf, in order to keep watch on the movements of her northern rival. France, in the far south, protested against being left out in the cold, for was she not as great a Power as any of them? She demanded that the equilibrium of the political balance should be maintained by giving her the Bay of Kwang Chau, not far from the borders of her Anamite Empire. The Empress, who by this time had become Regent for the third time, was irritated beyond endurance, and while she feigned to yield to these demands rather than to make war without due preparation, she made it known to her people that if any other nation should come forward with similar demands she would declare war. In the meantime she made extensive purchases of war material, and sought by every means to propagate anti-foreign feeling among her people, as the best safeguard against foreign aggression.

Never had the anti-foreign feeling been at so low an ebb as during the short reign of the young Emperor. An awakening had shown itself among the Chinese people, which might be described as a shaking among the dry bones. Newspapers in the Chinese language had increased in two or three years from seventeen to seventy-six. The publications of the Society for the Diffusion of Christian and Useful Knowledge, consisting, not of "Christian Science," but Science Christianized, increased within the same time from \$800 to \$18,000. The whole people were penetrated with a desire for progress, and though they had been recently beaten in war by the Japanese, they proposed to imitate their victorious enemies and learn the best lessons of the West as the surest way of rehabilitation. When the Marquis Ito visited China, a little more than two years ago, I complimented him on the influence which his country was exerting on China in consequence of being her nearest neighbor. I compared it to the tide, raised by the moon, as our nearest neighbor in the solar system; but I took care not to hint that his country, like the moon, was shining by borrowed light. Yet it is true that the reforms which China and her young Emperor so much admired were borrowed at second hand from these United States.

Immediately on the occupation of Kiao Chau, the Germans proceeded to lay out railways in different directions across the province of Shantung, which they claimed as their sphere of influence, and which some of their newspapers, by way of anticipation, described as "German China." The natives were aroused much more by these enterprises than by any abstract question of infringement of territorial rights. To them it appeared horrible that the



spirits of their ancestors should be waked by the snorting of the iron horse, and that cemeteries should be desecrated by the passage of the iron road. They everywhere set upon the engineers and impeded the prosecution of their work. The most active in leading this opposition were the members of a secret society called "Boxers."

That society is not a new one called into existence, as has been supposed, by the work of missions; on the contrary, it gave trouble more than a century ago to the Chinese Government, and in 1803 was formally placed upon the Index of forbidden associations. Since then it has languished in obscurity until recent events called it into life and until the favor shown it by the Empress Dowager transformed it into a great political party. The doctrine to which it owes its existence is not orthodox Confucianism, Buddhism, or Taoism, but a superstition based on hypnotism, mesmerism, or spiritualism, as it is variously called. Among its members are many whose nervous condition fits them for spiritualistic mediums, and through these the Society gets oracles from the unseen world. They undergo a species of drill, which is intended to enable each member at will to go into the trance state. When in that condition they profess to be endowed with supernatural strength and rendered bullet-proof. These mysteries, so piquant to the curious at all times, were particularly attractive in view of possible hostilities with foreign nations. The organization spread like wildfire among the people of Shantung, and the Manchu Governor, Yuhien, finding in these people an auxiliary force, supplied them with arms.

The Empress Dowager, and Prince Tuan, father of the heir-apparent, encouraged them to come to the capital. In their devastating march they killed missionaries and laid waste Christian villages, nor did they abstain from many a village which was not Christian, but which excited their cupidity by the spoils which it offered. Reaching the vicinity of the capital, they tore up the railways leading to the west, and burned down the stations near the city. Then it was, not till then, that the Ministers in the capital awoke to the seriousness of the situation. Missionaries had been uttering their Cassandra warnings, but the Ministers always turned for information to the Tsung Li Yamen, the official organ or Foreign Office of the Chinese Government. They were there told that these Boxers practised an innocent kind of gymnastics, and if they did sometimes show themselves turbulent and disposed to quarrel with native Christians it was not without cause. But the Empress Dowager intended shortly to issue a



decree dismissing them to their homes. Such decrees were issued, accompanied by secret instructions not to regard them.

The meaning of the destruction of the railway was not to be misunderstood; the Ministers, without waiting for the consent of the Chinese Government, ordered a guard of marines to be sent up from the sea coast, and they arrived not a day too soon. The next day the railway to the east was also broken up, and had their arrival been delayed forty-eight hours no foreigner in Peking would have lived to tell the tale. There were only three hundred and fifty, all told, but their mere presence for a time held our enemies in check, and they served eventually to make good the defence of the Legations. On the 11th of June, a fortnight after their arrival, an attaché of the Japanese Legation was killed at the railway station by Boxers and Chinese soldiers combined. This may be regarded as introducing the first stage of the siege. For the next nine days the Boxers were specially prominent, setting fire not only to churches and mission houses, but burning up all the native storehouses which they suspected of containing foreign goods. Square miles of ground were left by them covered with the ruins of the richest business houses in Peking. On the 19th of June, a circular from the Foreign Office informed the Foreign Ministers that the Admirals had demanded the surrender of the forts at the mouth of the river. This, said they, is an act of war. You must now quit the capital with all your people within four-and-twenty hours. The Ministers agreed to protest against the severity of this condition. The first to set out for the Foreign Office with this purpose in view was Baron Ketteler, the German Minister. No sooner had he reached the great street than he was shot in the back by a man wearing the official costume of the Chinese Government, and fell dead. His interpreter was wounded, but succeeded in making his escape and giving the alarm.

The other Ministers believed that a general massacre had begun, and with their people, who had already taken refuge under their several flags, they fled precipitately to the British Legation, which, having been the residence of a high Prince, covered a large space of ground, and was surrounded by strong walls, forming a citadel capable of defence. It had accordingly been agreed upon as a place to make a stand in the last resort, and Sir Claude McDonald not only generously welcomed his colleagues but received all their people, whether civilian or missionary. The missionaries were accompanied by their converts, Catholic and Protestant, to the number of near two thousand. For the converts an asylum was

secured in the grounds of a Mongol prince on the opposite side of a canal from the British Legation. Professor James, the man chiefly instrumental in securing it, was himself slain by the enemy in the afternoon of the same day. Had the enemy followed up their advantage, they might, perhaps, in the midst of our first confusion, have overwhelmed all the Legations; but they feared to come to close quarters. Some of the outlying Legations were destroyed by fire, but most of them were included within our line of defence. None of them, however, except the Legation of Great Britain, was considered safe for the residence of a diplomatic family.

Within the gates of the British Legation, which covered six or seven acres of ground and contained twenty or thirty different buildings, were congregated nearly one thousand foreigners, and from this time for eight weeks we were closely besieged, not by Boxers, but by the soldiers of the Chinese Government. That very evening, at nightfall, they opened a terrible fusillade, and this was renewed day after day, chiefly under cover of night, so that we came to speak of it rather contemptuously as a "serenade." It was not, however, altogether ineffective, for day by day some of our men were killed or wounded, and in the sorties, which were occasionally made to drive our assailants back or to silence their batteries, the casualties were always serious. What we most dreaded was the firebrand, and when the ruthless enemy, with more than vandal ferocity, set fire to the library of the Imperial Academy, for the purpose of burning us out, we all had to assist in fighting the flames. Women and children, including the wives of Ministers, passed buckets from hand to hand. A change of wind came to our aid and the Legation was saved. At first the enemy assailed us only with fire and small arms; gradually, however, they got guns of considerable calibre in position and at all hours of the day attacked us with shell and round shot. Mrs. Conger, wife of the Minister, in whose family I was kindly received as a guest, had embraced the ideal philosophy of Bishop Berkeley, and looked on all this pyrotechny as a play of the imagination. I envied her the comforting delusion, for when I went out and picked up a six-pound round shot I found it too heavy and solid to be resolved into a fancy. Whether owing to her philosophy or to her Christian faith she is one of the most admirable women I ever knew; calm and unperturbed in the midst of danger, she realized the description which Pope gave two hundred years ago of his ideal woman, as "Mistress of herself though China fall."

Mr. Conger, an old soldier, who fought through all the years of our Civil War, and marched with Sherman from Atlanta to the Sea, met the trials and exigencies of this occasion with becoming fortitude and cool judgment. Diplomatist as well as soldier, he knows how to deal with the most serious questions that confront him as negotiator in this Chinese problem. His daughter, Miss Conger, had visited many water-cures in quest of health. The fire cure, to which she was now exposed, proved to be the required remedy. On the first fire she threw herself weeping into her father's arms; the next day she listened to it calmly, and then from day to day she seemed to acquire new strength, until she came out of the siege restored to perfect health. If I be asked how we spent our time, I answer—there was no frivolity and no idleness. Every man had his post of duty; mine was to serve as Inspector of Passes at the Legation gate for Chinese going back and forth between the Legations within our lines. There it was my sad lot to see many fine young men go out full of life and hope to come in wounded, maimed, and dying. We lost in all, killed and wounded, more than a third of our number. If we were asked what we lived on, I answer—the coarsest of bread and the poorest of meat. The meat was that of horses, varied by an occasional mule; even that was so reduced in quantity that only three ounces per diem were allowed for each individual. Milk was a luxury, even condensed milk beyond our reach, and no fewer than six or seven infant children perished for want of it. While the men fought or mounted guard the women made sandbags from day to day to the number of many thousands for the strengthening of our fortifications, and by their calm demeanor and hopeful words they strengthened the arms of their brave defenders. On one occasion it was deemed necessary to make a desperate effort to regain possession of a portion of the city wall which dominated these Legations. A company of some sixty men—American, British and Russian—was formed under the lead of Capt. Myers of the U. S. Marines. When ready to make the attack, and hoping to take the enemy by surprise, he made a short speech: "My men," said he, "within yonder Legation there are three hundred women and children whose lives depend upon our success; if we fail they perish and we perish with them; so when I say 'GO,' then go." The Americans and English were thrilled by his words, and the Russians understood his gestures. All felt that it was a forlorn hope, and all were ready to lay down their lives to insure success.

The movement proved successful, and that portion of the wall

remained in the possession of our men until our rescuers entered by the water-gate beneath it.

When the siege began we expected relief in a few days; but when Seymour's column was driven back we tried to wait with patience for the coming of the grand army under the eight banners. Yet so closely were we shut up that we had almost no information as to its movements, and our souls were sickened by hope deferred. At length, when our rations had run almost to the lowest ebb, when we had horse meat for only two days more, and bread for no more than a fortnight, so that starvation actually stared us in the face, one night, on the 14th of August, a sentry rushed into Mr. Conger's room, where I also was trying to sleep, and cried out: "They are coming. They are coming. The army of relief. I hear their guns!" The Minister and I were soon in the open air; we did not wait to put on our clothes, for we had never taken them off. We heard the machine guns playing on the outer wall; and never did music sound so sweet. It was like the bagpipes of Havelock's Highlanders to the ears of the besieged at Lucknow. The ladies were wakened, and soon men and women poured out from all the buildings and listened with irrepressible excitement to the music of the guns. Women threw themselves on each other's necks and wept, while men grasped hands with feelings too deep for utterance.

The next morning the great gates of the Legation were thrown open, and in rode a company of Indian cavalry. They were, I thought—and I have no doubt every one of our besieged garrison thought the same—the finest men I had ever looked upon.

The siege was ended. The rest of the army entered by the great front gate of the city, the key of which had been captured from the flying enemy by Captain Squires, of our Legation, who is one of the heroes of the siege. The next day we all joined in singing a Te Deum in the tennis court of the Legation, and Dr. Smith in a short address pointed out ten circumstances in each of which the finger of God was visible in our deliverance. He might have extended them a hundred. After thanking God, it only remains to thank our noble President for having despatched the army and navy to our succor without waiting to call an extra session of Congress. I feel proud of my country for the record she has established on this occasion—not only taking her place among the great Powers, who have interests as wide as the world, but showing that her arms are long enough to protect and rescue her people in all parts of the globe.

The curtain has not yet fallen on the last scene of this tremen-

dous drama. The Empress and her court fled the city, almost at the moment when our troops entered it, and she has taken refuge at an old capital in one of the northwestern provinces. Whether the government will be re-established at Peking is highly problematical. For my own part I think the restoration of the young Emperor, who might carry out his progressive measures under the supervision of the Great Powers, offers the best solution. The integrity of the Empire would then be maintained, and possible conflicts between European claimants averted.

China must, of course, pay a heavy war indemnity. It is understood that not only the foreign nations, but individual foreigners, will be indemnified. But no assurance is given that any compensation will be made to native Christians whose houses have been burned and whose relations have been slaughtered. Diplomats and military men have joined in acknowledging that but for the bone and muscle supplied by those native Christians the defence of the Legations would have been impossible. Though they performed the humble office of navvies in building barricades, digging trenches, and countermining against the enemy, their services were indispensable to the common safety.

" Heaven framing, each on other to depend,  
Bade each on other for assistance call,  
Till one man's weakness grows the strength of all."

I cannot believe that any Christian country will consent to the gross injustice which is involved in excluding them from the provisions of the indemnity clause.

The greatest enemy to the orderly and profitable intercourse of nations is heathen darkness. Of Pagan superstition we may say:

Unglaube du bist nicht so viel ein Ungeheuer,  
Als Aberglaube du !

No restriction, therefore, should in any way be placed on the operations of missionary bodies who seek to dispel that darkness and to diffuse the light of science as well as religion. Without these our railway and mining enterprises will be insecure, and we can have no assurance that that monster, the dragon, who has now been cast down before the Soldiers of the Cross, will not again raise his head and bring about another catastrophe similar to that which has so lately horrified the world.

## AKARNANIA AND ÆTOLIA.

BY

RUFUS B. RICHARDSON.

Since I took my first hasty glimpse of Akarnania and Ætolia in 1894, that region has drawn me powerfully, and I have made four other visits there, more careful and of longer duration than the first, the peculiar charm which I felt at first strengthening its hold upon me with each fresh visit.

It is a neglected corner of Greece. Not one in five hundred of the strangers who visit Greece thinks of paying it a passing visit, although for ten years the Northwestern Railway has made it possible for one to leave Athens in the morning and lodge the same night at Agrinion, in the heart of Ætolia. Whether the projected extension of this railroad from Agrinion to Arta, the ancient Ambrakia, will alter this state of things may well be doubted. Fate seems against this paradise—for paradise it is. One coming from Attica or Argolis wonders at the large shady oak groves and the broad, flowing rivers (most rivers in Greece are simply dry beds), and asks, Why don't the Greeks flock from the barren hillsides and dry plains of Eastern Greece to till this rich soil and build towns? It is also wonderfully picturesque. Here is a lake ten miles long and four miles wide—a rare thing in Greece—with high mountains a little removed, for a background on its long sides. But nobody seems to enjoy it. Not until my third visit did I see a single boat on that inviting water. Here, too, are springs of the coolest water, flowing abundantly, and nobody to drink from them, while πολυδαίμων Argos, and still drier Athens, are crowded with people wrangling over the question how they shall get the water absolutely necessary to keep the cities alive.

It is true that the richness of the soil has been recognized to some extent. Agrinion has become a thriving town of ten thousand inhabitants, and the centre of the tobacco industry in Greece. There are also stretches along the edge of Lake Trichonis that are almost as full of fruit trees of all kinds as is the famous Lelantine plain between Chalkis and Eretria. Mesolonghi and Anatoliko are prosperous towns on the shore of the lagoon which cuts deep into Ætolia. But in general the villages are small and far apart. One traverses the distance of thirty miles between Agrinion and the Ambracian Gulf, on the main highway, without passing through a single village, although the wretched hamlet of Sourovigli, which

is crowded into the ruins of Stratos, the capital of Akarnania, does lie close to the road.

The climate is as healthy as the soil is fertile; life and property are as safe as anywhere in Greece; and yet population does not drift that way. There is no other word but *fate* to account for this neglect of a land of such natural attractions. It seems given over to those travellers who like to feel that they are off the beaten track, who take delight in scenery that has not been enjoyed by all the world and described to death, and who can take the discomforts of bad inns and lively beds as a piquant sauce in the feast.

Perhaps the most striking feature in this fate is that it has been operative from time immemorial. Just as Ætolia and Akarnania are not included in the modern Baedeker, they were also left out of the ancient Baedeker, Pausanias. It is a territory about equal in extent to that of Attika and Bœotia; and yet while Attika has filled the world with its fame and permeated it with its influence, and while Bœotia has given us Pindar and Plutarch and Epaminondas, there has been no Ætolian or Akarnanian whose name has found a place in the world's book of fame. That a sort of rough honesty went with their destiny obscure is, in the case of the Akarnanians at least, amply attested. The Ætolians, too, who used to be regarded as a sort of robber brood, unfit to be counted with civilized Greeks, did show so much character in the later days of degenerate Greece in annihilating the hosts of invading Gauls, and in offering some real resistance to the Roman legions, that one questions whether they would not have made more of a showing if they had had one poet or historian to magnify or even to record their deeds. It is the bard who makes famous. How reverentially we follow in the footsteps of the bard!

From this lack it has come about that, whereas in other parts of Greece the search has been for sites that correspond to names famous in song and story, in Ætolia and Akarnania one has to seek—often in vain—for a name to fit a most imposing ruin. Two notable illustrations of this principle may here be adduced.

By the northern shore of Lake Trichonis, on a foothill of the great Ætolian mountains to the north, is an acropolis which is a masterpiece of fortification, with a walled town of considerable dimensions stretching from it down to the lake. For this imposing ruin practically each topographer who has busied himself with the region has proposed a separate name, always with some reserve. It has become an item of interest when a new article or a new book appears treating of Ætolia to observe what name the writer will



give to this ruin near the modern village of Paravola. The latest writer on the subject\* says:

Bazin suggests that the place was called Boukation—a name only mentioned in an inscription found in the neighboring ruins at Krionerou. This is the most satisfactory identification hitherto proposed; in the present state of our knowledge it is the only one possible, but beyond that no more can be said either for or against it.

The second case is that of the justly admired acropolis called Vlocho, about five miles back from the north shore of Lake Trichonis and about the same distance east of Agrinion. Vlocho deserves to be called a fortified mountain rather than an acropolis. It is half as high again as Acro-Corinth; and even Ithome falls considerably short of it. Of all the acropolises of Greece only the Arcadian Orchomenos overtops it by a few hundred feet, and is not nearly so impressive, because it reaches its height of over three thousand feet by starting from a plain already considerably over two thousand feet above the sea-level.

When Col. Leake, the great pioneer topographer of Greece, in 1805 saw this citadel, made impregnable both by nature and art, he felt that this, and no other, was Thermos, the capital of Ætolia. He says:

I have not entertained the supposition that Thermos could have occupied any other site than that of Vlocho, the description of Polybius, but still more the magnitude of the ruins, leaving scarcely a reasonable doubt on this head.

And yet in order to identify Vlocho with Thermos he had to do the greatest violence to the words of Polybius, who, in describing the forced march of Philip V. of Macedon, in which he broke camp on the Acheloos, near Stratos, at daybreak, and reached Thermos at evening in season to sack it before nightfall, says that he marched with his left protected by Lake Trichonis. Leake, a soldier himself, saw that no mortal soldiers could have started from Stratos and made the entire circuit of the lake—over very rough ground, too, some of the way—and reached Vlocho on the same day. But with the prepossession above mentioned, he changes the word "left" in the narrative of Polybius to "right," with the remark:

The only conclusion seems to be that the words right and left have, by some negligence either of the historian or his copiers, been substituted for each other in the text. Experience proves that such an error, notwithstanding its importance, is one of the most common that occurs.

The last part of this remark is certainly true; and Leake has in other cases detected such an error, and earned by it praise and thanks. But in this case Vlocho had thrown a spell over him, and closed his eyes to one very important consideration, viz.: that the

\* W. J. Woodhouse. *Ætolia: Its Geography, Topography, and Antiquities.*—Clarendon Press, 1899.

distance from the Acheloos below Stratos to Vlocho is so short that the famous forced march of Philip, which lasted from dawn till nearly evening of a long summer day, is reduced to about ten miles!

The conclusion ought to have been obvious that Thermos was not at Vlocho, and in spite of Leake's reputation for infallibility, which he almost deserved, there have never been wanting topographers who boldly looked Vlocho in the face, and said such a citadel *ought* perhaps to be Thermos, but it is not. If challenged to give some adequate name to it they frankly confessed inability, but were contented to search for Thermos somewhere near the east end of Lake Trichonis, a place capable of being reached by the forced march along the south shore of the lake, as Polybius describes it.

In the spring of 1897, when the war-cloud was hovering over Greece, I visited the ruins called Palæo-Bazari, near Kephalovrysi, with Charles Peabody, a former member of the American School; and so convinced were we that there and there only were the ruins of Thermos that he desired to put our conviction to the test by a small excavation enterprise, for which he was willing to contribute \$500. I applied to the authorities for the concession of the site, and received an oral assurance that we could have it. But the war-cloud had already burst before we had got back to Athens; and all archæological undertakings were relegated to the rear. Within less than a year a fortunate Greek, who had gone over into Ætolia with powers to explore whatever he pleased, made his first trial at this very spot; and long before he had spent the equivalent of \$500 he had abundant and incontrovertible evidence, particularly inscriptions, that he had found Thermos.

This happy man, Georgios Sotiriades, has already carried on three excavation campaigns there; and as everything lay very near the surface, the work went rapidly. Perhaps never in Greece has so great a result come from so little outlay of time and money. I felt some disposition to envy; but in the archæological circles at Athens envy is unknown. Each man sets down his neighbor's success as contributing to an end which all are striving for. Then, too, we were having good luck at Corinth. But when I was dealing with my twenty-five feet of earth I could not help envying the man who had to deal with only four feet. Mr. Sotiriades has just filled the last number of the Greek Archæological Journal with a part of his splendid results, making one of the most important contributions to the history of archaic art.

But questions about art take us too far afield from our topography. Sotiriades, having found Thermos, could have left others to find a name for Vlocho. But he has done something towards

this also by finding an inscription on the slope of the mountain, which showed that it was the stronghold of the Thestieis, who once held the rich plain of modern Agrinion, and who, if we can judge from the legends which connect the name of their ancestor king, Thestios, with Meleager and the Calydonian Boar Hunt, were the original Ætolians—the Eteo-Ætolians. It is true that we come out with an anti-climax in this mere tribal name, which must be accepted for Vlocho. Such a place ought to have had a name as famous as Thebes; but it lacked the historian, and above all, the bard.

On the Akarnanian side of the Acheloos rises a hill in the marshes. It is an irregular hill, or rather a combination of several hills, that once constituted an island. Indeed, it has a harbour, which now looks strange several miles inland. A wall with innumerable turns, and pierced by many gates of diverse structure, encloses the entire hill. The total length of the wall is about four miles, and constitutes the most extensive fortification in Greece. But, lying rather low, it does not attract the gaze from afar as does Vlocho. This is Cēniadæ, not the capital, but perhaps the most important city of Akarnania. Such walls as these seem a title to fame; and yet Cēniadæ has almost no history transmitted to us. Pausanias devotes a chapter to an episode in its history in his "Messeniaca," in which he describes how the Messenians, expelled from their homes by the Spartans and settled by the Athenians in Naupaktos, wished to show that they owed their low estate more to unkind fortune than to any lack of courage, and so without provocation attacked this stronghold, took it away from the Akarnanians, and held it for a whole year against their combined attacks.

The isolated position of Cēniadæ in the marsh, and its consequent inappropriateness for a Byzantine or Frankish fortress actively controlling the surrounding country, has prevented that long occupation of mediæval and modern population which always proves so destructive of ancient remains. It would, therefore, not be surprising if excavations should here bring to light a good deal of the ancient city, which cannot be very deeply buried. Akarnania is as likely to have been an art region as Ætolia; and the amount of objects of art found at Thermos, remaining over after the systematic pillage of Philip V., encourages the hope that something good may be found at Cēniadæ. The theatre is protruding out of the ground, and so affords a starting-point. Near by is a terrace that may well hold the remains of a temple. The Greek Government has granted the American School the privilege of making a trial excavation here this winter.

CAPTAIN FABIAN GOTTLIEB VON BELLINGSHAUSEN,  
1819-1821.

THE DISCOVERY OF ALEXANDER I., PETER I.,  
AND OTHER ISLANDS.

BY

F. A. COOK.

While the American sealers were swarming in, the Antarctic waters and searching every rock for fur seals, two Russian exploring vessels suddenly appeared among them. These were the *Vostok* and the *Mirny*, commanded by Captains Bellingshausen and Lazarew. It is unfortunate that the record of this important expedition was published only in the Russian language, for, because of this, the far-reaching results have been largely lost. The Russian voyage is marked on the Admiralty charts, but all the chroniclers to the present time have either omitted this voyage or passed it over by a few vague statements. Bellingshausen and Lazarew made one of the most notable voyages in the Antarctic, and they deserve to take their place in the first rank of South Polar explorers. They gained for Russia the honour of having discovered the first land beyond the Antarctic Circle. They circumnavigated the globe closer to the regions of perpetual ice than did Captain Cook, and altogether the Russian Antarctic efforts are to be classed as second only to those of Cook and Ross.

Baron Fabian Gottlieb von Bellingshausen was captain of the *Vostok*, and commanded the expedition. He was one of the officers of Admiral Krusenstern's staff on a voyage around the world in 1804, and this Antarctic voyage of Bellingshausen's was one of several enterprises fostered by the Russian Government to display the increasing strength of its navy. It is not known whether the Russians were ambitious to find sealing grounds in the far south, but it is probable that they expected to find new regions comparable to those of the Bering Sea area.

The two vessels, the *Vostok* and the *Mirny*, were slow, cumbersome sailing crafts. They left the Russian harbor of Kronstadt in 1819, and Bellingshausen was instructed by Alexander I. to push as far south as possible. The vessels were sailed down the Atlantic, and on December 15th South Georgia was sighted. Sailing around

the southern termination of this land, the commander next took a course southwesterly for Cook's Sandwich Land. On this track he discovered a lofty island on January 3, 1820, the position of which was latitude  $56^{\circ} 41' S.$ , and longitude  $28^{\circ} 9'$  west of Greenwich. On the following day two more islands were discovered. To this group of three islands was given the name *Traversey Islands*, in honor of the Russian Minister of Marine. One of them was an active volcano, and this was named *Savadovskii*.

On January 8th, Bellingshausen reached the *Candlemas Islands*, the most northern group of Sandwich Land. After cruising here for a few days, Bellingshausen was convinced that Cook's discovery was not a part of a large land, but a detached group of small islands far away from any mainland. Continuing southward, the vessels were forced through fog and storm over a rough sea to the edge of the pack-ice. After reaching  $60^{\circ} 10' S.$  on longitude  $28^{\circ} W.$  the sea was so closely packed by drifting ice that it was necessary to retreat northward. A second attempt was made further eastward and proved equally unsuccessful, but in a third attempt made still farther eastward, he was able to take a course almost due south to latitude  $69^{\circ} 21' S.$  on longitude  $2^{\circ} 15' W.$ , where he was stopped by an impenetrable pack on January 28th. Again the vessels were pushed northward and eastward, and on February 2d they were on longitude  $1^{\circ} 11' W.$  and latitude  $66^{\circ} 25' S.$  Here the ice was also closely packed and the course was laid still farther eastward, always in the hope that an opening would be found poleward. At latitude  $65^{\circ} S.$  and longitude  $18^{\circ} E.$  the wind and ice seemed more favorable, and here another effort was made to push into the frozen south.

Through waters fairly free of sea ice, though liberally strewn with large icebergs, the vessels were forced to  $69^{\circ} 6' S.$ , where they were again stopped by closely-packed ice. During February 17th and 18th successive efforts were made to find a passage southward; but the south was everywhere guarded by an endless sea of ice, which it was found impossible to navigate. On the 19th all attempts at farther progress were relinquished and a course northward accordingly set. As they turned from the ice a sea-swallow (*Sterna*) was observed, and the bird was taken as an indication of a proximity to land. Their position, at the time this bird was seen, was latitude  $68^{\circ} 5' S.$ , longitude  $16^{\circ} 37' E.$  Sailing eastward, a course was laid somewhat south of latitude  $65^{\circ}$  to longitude  $34^{\circ} E.$ , and then pressing a little southward at  $40^{\circ} 56' E.$ , latitude  $66^{\circ} 53' S.$  was attained. Here the ice was again found so dense

that further attempts to penetrate it were thought to be useless. The course was now continued along latitude  $62^{\circ} 30' S.$  as far as longitude  $69^{\circ} E.$  Here Bellingshausen took a more northerly course, but still somewhat below  $60^{\circ} S.$  to  $88^{\circ} E.$ , from whence, in the latter part of March, while surrounded by drift ice and hampered by fog and storms, he laid a course for Port Jackson (Sydney), New South Wales.

The southern winter was spent in exploring the Paumotu group, and, as the summer advanced, Bellingshausen left Sydney for another Antarctic cruise. His course was, at first, almost due south. On December 10th, 1820, he encountered the first icebergs in latitude  $62^{\circ} 18' S.$ , and longitude  $164^{\circ} 13' E.$ , and soon after a dense pack barred progress, whereupon a more easterly course was set. This pack differed from that which was seen during the previous season in the larger number and increased dimensions of the icebergs mixed with the field ice. One of these huge table-topped masses was estimated to be seven miles long. The voyage was continued to the eastward, and the number of icebergs still increased—so much so that at one time upwards of one hundred were counted from the masts. After many trying experiences in navigating ice-strewn seas through fogs and tempests, Bellingshausen at length reached what seemed to him to be the end of the pack-ice, for on December 14th, beyond to the south and east, there was an open sea full of promise. Sailing continually over these waters eastward crossing the Antarctic Circle, and always edging southward with every favorable wind, at the end of a week he was again confronted by the discouraging line of impenetrable ice. Again large numbers of great icebergs were seen, one of which is said to have been eleven miles long.

Returning a second time to  $60^{\circ} S.$ , the vessels were forced eastward; but soon their course was again set southward, and on longitude  $120^{\circ} W.$ , latitude of  $67^{\circ} 50' S.$  was made on January 13th, 1821. Again they were headed off by a dense pack-ice, and again they returned northward to  $63^{\circ} S.$ , where they continued to press to the eastward. On  $103^{\circ} W.$  longitude, Bellingshausen crossed the Antarctic Circle for the sixth time.

The farthest point south reached by the Russians was here attained in an easterly cruise along the pack edge. Led on by a remarkably bright iceblink, they penetrated a bight in the pack at longitude  $92^{\circ} 19' W.$ , and reached latitude  $69^{\circ} 53' S.$  on January 22d. Here, however, Bellingshausen was again compelled to seek the more favorable waters northward, because of the unyielding pack

to the south and the dangerous tongues of drift-ice about him, which threatened to ensnare the ships. While steering northward from their farthest south the explorers perceived, far to the eastward in the afternoon of the same day, a small dark spot, which quickly aroused their interest. As the weather cleared, this spot was made out to be a high, snow-covered land. The vessels were hove to, and on the following day, by a nearer approach, an opportunity was afforded for a more careful survey of the land.

The newly-discovered land proved to be a single island, with an estimated altitude of over 4,000 feet. It was called Peter I. Island, and its position was fixed at latitude  $68^{\circ} 57' S.$ , longitude  $90^{\circ} 46' W.$  Being convinced that more land was to be found in this region, Bellingshausen sailed eastward at a safe distance from the pack-edge in latitude about  $68^{\circ} 30'.$  On January 29th, 1821, his anticipations were realized, for, looking eastward far beyond the pack-ice, he saw what to him appeared like the coast of a large country, offering a prominent cape. Though eager to make a closer examination of the land, it was found that the pack-ice would not permit a nearer approach than a point forty miles to the west. The discovery was named, in honor of the Tsar, Alexander I.'s Coast, but it has been charted Alexander I. Land. The most prominent cape seen from Bellingshausen's position was placed on latitude  $68^{\circ} 43' S.$  and longitude  $73^{\circ} 10' W.$  From here a course was set northeastward, at some distance from Graham Land, to the South Shetland Islands, where the American sealers were met. The homeward voyage was by way of the South Orkneys and South Georgia, and Kronstadt was reached in July, 1821. Bellingshausen thus completed in two years a most successful voyage of exploration around the world in high southern latitudes.

In the French and the Russian mind there still survived a faint belief in a great Austral continent, but this sweeping voyage of Bellingshausen and Lazarew dispelled the last hope of discovering any large and commercially useful land towards the south pole.

The *Belgica* sailed somewhat closer to Alexander I.'s Coast, and upon her I made the following entry in my log:

S.S. *Belgica*, February 16th, 1898.

At noon our latitude is  $67^{\circ} 58'$  south, the longitude  $69^{\circ} 53'$  west of Greenwich. We haul a little westward of the outer drift of the pack, and Alexander Land rises up over our port bow, still forty or fifty miles away. There are scattered in the waters westward, and in the pack eastward, forty-four icebergs of moderate size. About half of these are tabular in form; the other half are of the pin-



nacled and sea-washed or weather-worn variety. A few small black-billed penguins are in the water, darting over the surface and again into the deep with electric swiftness. Close to the pack-ice there rises from the black surface of the sea a number of columns of vapour-like jets. Through our glasses we see under these the blue-black backs of whales, with large dorsal fins, and occasionally a ponderous tail whips the water into a foamy whirlpool. On some of the pans of ice are seals basking in the sun, and over the ship, apparently touching the masts and the ropes as the bark rocks to and fro, are giant petrels, Cape pigeons, gulls, white, brown, and blue petrels, all pointing their bills and stretching their necks to examine, perhaps for the first time, human beings and their crafts.

There is a dreamy stillness in the air, in spite of the frequent stir of wild life, and a charming touch of colour to the sea, the ice, and the land, though the sky is dull, gray, and gloomy. At first glance all seems white and black, and we are impressed with the weight of the awful snowy solitude into which we are entering. A sense of chilly loneliness is more and more forced upon us by the passing panorama of snow and ice and deserted rocks. But, critically considered, after the first pangs of desolation have passed there are a few of us who find cheer and fascinating colour in the harmony of the perennial chilliness before us. This morning there was a break in the clouds, and through this came a flood of yellow light which made the bergs studding the sea and the icy cliffs of Alexander Land stand out like walls of gold. Shortly after noon a pale blue was thrown over the white glitter of the pack, which increased the high lights, darkened the shadows, and made the moving mass of whiteness, as it rose and fell with the giant wave of the sea, a thing of gladness.

At four o'clock in the afternoon we had made a rough outline of the new land before us. It proved to be a group of islands (Alexander Islands) about twenty-five miles long and from ten to fifteen miles wide. There is one large central island, about eighteen miles long, with a high ridge of mountains running approximately from east to west. In this ridge there are three peaks, not less than four thousand five hundred feet in altitude. These are quite pyramidal in form, and are covered with snow to their summits, with only an occasional bare, perpendicular rock. This ridge of mountains tapers gradually towards the west and terminates abruptly in the east. Running parallel to this central ridge, about four miles southward, there is a lesser chain of mountains, about two thousand feet high, whose sides sink almost perpendicularly into

the sea. There is also a similar ridge to the southward. The two valleys between these three ridges of mountains are filled with great streams of glacial ice. We had a splendid view of these glaciers as we passed about twenty miles off the western end of an island. The northern valley is rough, much crevassed, and generally irregular, extending its tongue out over the sea for several miles. The valley south of the central ridge appeared like a great plain, with easy slopes towards the sea, where the frozen mass seemed to project over the waters for a short distance. Around this one large island are a number of small islands—angular, rocky masses, mostly covered with caps of glacial ice. These, from a greater distance, appeared to be a part of the main central land mass. The vast numbers of icebergs to the eastward of the land gave it also, from a greater distance, the appearance of being connected with some larger land; but from our various positions we were able to make out distinctly that the islands are a separate group, with no other land within sight to the east. Our positions—northward in the morning and southward during the night—proved this. We saw some signs of land to the south during the afternoon, but these vanished later. It was evidently a mirage.

## ST. CHRISTOPHER, WEST INDIES.

BY

W. H. ALEXANDER.

A correct and reliable knowledge of the West Indies is obtained only by a careful study of each island composing the group. The individual peculiarities of each island constitute the most surprising, and certainly not the least interesting, feature of this study. This island-peculiarity characterizes to a greater or less degree the geology, the geography, the climate, the flora, the history, and the occupations of the people. Of course, there are some things which may be truly said of the whole group; but these general statements are fewer and less trustworthy than is generally realized. In the hope, therefore, of contributing something of real value to the much recently written about the West Indies, this paper is prepared, taking for consideration the little island of St. Christopher, or St. Kitts, as it is very generally known.

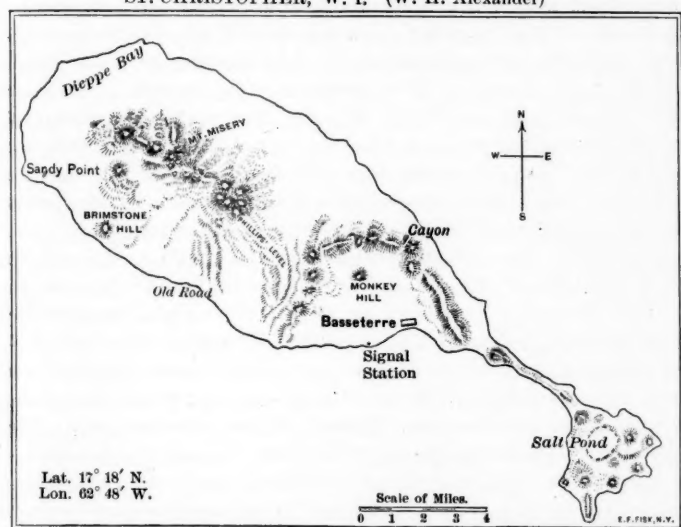
This island has a most charming political history; but it would be foreign to the main purpose of this paper to follow this line further than to say that at the time of its discovery, in 1493, it was inhabited by the fierce and war-like Carib Indians, among whom the island was known by the name of *Laimuiga*, meaning the fertile. Columbus, the discoverer, however, chose to call it St. Christopher, which name it still bears, notwithstanding the English tried many years ago to give it the name of St. Kitts. It must be confessed that the Indian name is the more appropriate. To the English, led by Sir Thomas Warner, belongs the credit for its colonisation, which began in 1623. It is the oldest English settlement in the West Indies. To establish and maintain this colony, and to acquire an undisputed title to the island, England has given freely of both blood and treasure; and it is not too much to say, perhaps, that no other one of her present possessions, considering its size and relative importance, was so dearly purchased. The island is now an English Crown Colony, being one of the "Leeward Islands," the seat of government of which is at Antigua. Local affairs are under the direction of an Administrator, aided by a Council.

Geologically considered, the island is of volcanic formation, as abundantly shown by the presence of thick layers of volcanic scoriæ,

known as *lapidi*. These ashes or cinders are found near the surface, and at great depths, in all parts of the island. At Sandy Point, for instance, layers of volcanic dust alternate with layers of soil for a depth of seventy-five feet, on a substratum of gravel. The soil is a dark-grey loam, very porous, and highly adapted to the cultivation of sugar cane. Clay may be found in the high lands, but not in the low.

The accompanying outline map gives a very correct idea of the geographical position and topography of the island. As indicated thereon, the central portion is occupied by a range of lofty, rugged mountains, crowded together, as it were, and intersected here and

ST. CHRISTOPHER, W. I. (W. H. Alexander)



there by rocky precipices. The culminating point of this mountain range is near the north end of the island, and is known as Mount Misery. This mountain is more than four thousand feet high, and is an extinct volcano, the crater of which is regarded as one of the most interesting features of the island, especially by tourists. From fissures in the sides and bottom of this crater issue constantly sulphurous fumes, and some places are too hot to stand upon with comfort—the water in some of the springs being hot enough to cook an egg. There is also within the crater a beautiful lake. From the “lip” of the crater to the bottom is about 600 feet.

From the southeastern end of the main body of the island extends a long narrow neck, which spreads out fan-like, and upon which rise a number of conical hills and mountains. The entire length of the island is about twenty-three miles, and the average breadth of the main body is about five miles, giving a total area of something like sixty-eight square miles, of which only about 13,400 acres are suitable for cultivation, the remainder being used as wood and pasture lands.

The climate of St. Christopher, for a tropical one, is decidedly healthful and temperate, being absolutely free from extremes of heat and cold. The average temperature for the year is less than 79° F., while the annual mean daily range of the temperature is less than ten degrees. The month of February, closely followed by the month of March, is the coolest month of the year—the average temperature being about 76° F., and the average daily range less than nine degrees. The month of August, with an average temperature slightly above 81° F., and an average daily range of less than nine degrees, is the hottest month, with September not far behind. These summer temperatures may appear to be too high to be comfortable; but owing to the fresh and constant trades this heat is robbed of its otherwise oppressive nature, so that one does not often feel uncomfortably warm except when exposed to the direct rays of the sun. The records at the United States Weather Bureau at Basseterre show that the highest temperature for 1899 was 89° F., and the lowest 64° F., thus giving an absolute range of only twenty-five degrees. The same records show the relative humidity of the air to be about seventy-five per cent., on an average, for the year. Rainfall is frequent but not heavy; rains occur on an average of every other day. Records for many years back show the total rainfall for the island to average about fifty-nine inches for the year. From local causes certain parts of the island have much more rain than others. The fall is well adapted to the cultivation of sugar cane; the greatest amount falls in September and October, and the least in February and March. Taking it all in all, the month of May most nearly approaches the normal meteorological conditions for the year. The barometric range is very small, being less than .09 inch for the year. The prevailing winds are from the east, with an average velocity of about ten miles per hour. Situated, as it is, in or near the usual path of the West Indian hurricanes, the island is occasionally devastated by one of these. But this does not occur every year by any means; it is sometimes fifteen or twenty years between visits.

The island is also subject to earthquakes, but these are, or have been, comparatively harmless.

The present population consists of white, colored, and black persons—about 30,000 altogether. Practically, all of these depend upon wages earned by labor for a support. As the land is owned chiefly by persons residing elsewhere, very few of the people here are able to own or rent any land; and as the only industry of any consequence is the sugar industry, the business of the island is measured by this one crop: if the crop is good, and the price fair, all goes well; but if the crop is short, and the price of sugar low, then follows a most wretched condition of affairs, especially among the poor laborers. Owing to the depressed condition of the sugar industry and the short crop last year—due to the hurricanes—there has been quite an exodus of laborers from this island to the more prosperous ones. There have been efforts made to develop “minor crops,” but without practical results. Many plants, such as cotton, tobacco, coffee, etc., do well here; but the owners of the estates do not seem to realize so much from these crops, and hence they are abandoned. There is no question that sugar is *the* crop of the island—better suited to the soil than any other.

At one time the exportation of salt, taken from the pond shown on the map, was both extensive and profitable; but, although the yield and quality of the salt are as good as ever, this industry has been abandoned.

A very great historic interest attaches to Brimstone Hill, as it was at one time a strong fort, and the scene of many bloody engagements. It has been abandoned for a number of years.

To attempt to convey an adequate idea of the exquisite beauty and vernal richness of the flora of a tropical island is positively hopeless: these must be seen to be appreciated. Particularly is this true of St. Kitts, which is often called the “Garden of the West Indies.” Here may be seen plants and flowers in endless varieties; leaves and flowers of every hue and color; ferns, from the tiniest to the gigantic tree fern; fruits in great variety; useful woods and ornamental trees, vines, orchids, etc. To give a list of all these would be far beyond the limit of this paper.

I feel constrained, however, to mention a few of the fruits to be had on the island. Speaking in a general way, I may say that tropical fruits, as compared with the fruits of temperate climates, appear to be rather insipid, and one must “learn to like them” after using the fruits of the colder climates:

Bread Fruit— <i>Artocarpus incisa</i> .	Guava— <i>Psidium montanum</i> .
Avocado Pear— <i>Persea gratissima</i> .	Pawpaw— <i>Carica papaya</i> .
Mango— <i>Mangifera indica</i> .	Plantain— <i>Musa paradisiaca</i> .
Tamarind— <i>Tamarindus indica</i> .	Chenip— <i>Melicocca bifuga</i> .
Granadilla— <i>Passiflora quadrangularis</i> .	Nutmeg— <i>Myristica moschata</i> .
Belle Apple— <i>Passiflora laurifolia</i> .	Shaddock— <i>Citrus Pompelmous decumana</i> .
Arnotto— <i>Bixa orillana</i> .	Orange— <i>Citrus bigaradia</i> .
Banana— <i>Musa sapientum</i> .	Orange— <i>Citrus aurantium</i> .
Sapodilla— <i>Sapota achras</i> .	Lemon— <i>Citrus medica</i> (varietas <i>limonum</i> ).
Cocoanut— <i>Cocos nucifera</i> .	Lime— <i>Citrus aurantium</i> (varietas <i>spiosissima</i> ).
Cassava— <i>Janipha utilis</i> and <i>manihot</i> .	Icaco Plum— <i>Chrysobalanus icaco</i> .
Cashew— <i>Anacardium occidentale</i> .	
Almond— <i>Terminalia catappa</i> .	
Aloe— <i>Aloe vulgaris</i> .	

In many cases there are several varieties of the fruit mentioned above.



## NOTES ON CLIMATOLOGY.

BY

ROBERT DEC. WARD.

RECENT CONTRIBUTIONS TO ANTARCTIC METEOROLOGY.—During the last few months a considerable number of papers relating to the meteorological conditions of the Antarctic have been published. Arctowski, the meteorologist of the *Belgica* expedition, has contributed to *Ciel et Terre* (Brussels) the following: *Résultats préliminaires des Observations météorologiques faites pendant l'Hivernage de la Belgica*: I. *Température de l'Air* (Aug. 1, 1899, 245-248); II. *Pression Barométrique* (Aug. 16, 1899, 269-275); III. *Roses des Vents*; and IV. *Phénomènes atmosphériques* (Oct. 1, 1899, 353-364). Arctowski has also published *Sur les Conditions météorologiques des Régions antarctiques* (*Ciel et Terre*, Oct. 16, 1900, 379-384), in which he compares the observations made by him on the *Belgica* with those made at Cape Adare on the Borchgrevink expedition. The meteorological results of the *Belgica* expedition have likewise been included in Dr. Frederick A. Cook's *Through the First Antarctic Night* (New York, Doubleday & McClure Co., 1900), in which the author also makes some interesting notes on the physiological effects of the Antarctic night, and have been briefly discussed by Supan in the *Meteorologische Zeitschrift* for May, 1900. Woeikof contributed a paper under the title *Arktis und Antarktis* to the *Meteorologische Zeitschrift* for February, 1900 (75-79), and Borchgrevink discussed the *Southern Cross* results in the *Geographical Journal* for last June. These data have been reprinted in the *Quarterly Journal of the Royal Meteorological Society* (London) for October, 1900 (292-296). Fricker's *The Antarctic Regions*, recently published (New York, The Macmillan Co.), includes a chapter on climate. The valuable meteorological results obtained on the recent expeditions of the *Southern Cross* and of the *Belgica* may be said to have increased the appetite of meteorologists for the still more extended contributions to Antarctic meteorology which may be expected from the coming English and German expeditions.

THE ARGENTINE AND INDIAN WHEAT CROPS.—The November number of the *Bulletin of the Bureau of American Republics* calls attention to some interesting facts in connection with the climatic

control of the time of harvest in Argentina and in India, and the relation between the time of the harvest and the price of the wheat. The harvests of the Argentine Republic and of India take place during what is known in other wheat-growing sections of the world as the "dead season." In the former country, the harvest usually begins late in November in the northern latitudes, and progresses southward until early in February. In India, on the other hand, the harvest commences late in February in the south and progresses northward until early in May. The shipments of wheat from these two countries consequently come to the world's markets at a time when the stock on hand has been considerably depleted, and, therefore, these late supplies have a ruling effect on prices.

THE HARVARD METEOROLOGICAL STATIONS IN PERU.—In this *Bulletin*, Vol. XXXI., pp. 368-369, mention was made of the valuable pioneer work in meteorology which has been carried on by the Harvard College Observatory in connection with its Southern Station at Arequipa, Peru. Professor Pickering's Annual Report as Director of the Harvard College Observatory contains the unwelcome announcement that the meteorological observations at all the stations except Arequipa were discontinued on Jan. 1, 1901. This means the abandonment of the highest meteorological station in the world, on El Misti (19,200 feet), as well as of the interesting station at the old Inca capital, Cuzco, and of those at Molendo (100 feet), La Joya (4,150 feet), Alto de los Huesos (13,300 feet), Misti Base (15,600 feet), Vincocaya (14,600 feet), and Puno (12,500 feet). The reasons which have induced Professor Pickering to discontinue these stations are excellent; but meteorologists will nevertheless receive with regret the announcement that this step has been taken. Professor Pickering points out that observations of great accuracy cannot be expected where the observers are necessarily men of limited education and experience. To maintain trained observers at all these stations would mean a greatly increased expense. In the region in which these observations have been taken the uniformity of meteorological conditions from year to year is so striking that but little would probably be gained by continuing routine observations during a long series of years. Although the step which has been taken is to be regretted, meteorologists are under the greatest obligations to the Harvard College Observatory for the splendid contribution it has already made to the climatology of Peru.

PROPERTY LOSS BY LIGHTNING IN THE UNITED STATES IN 1899.—Professor A. J. Henry, of the United States Weather Bureau, considers the property loss by lightning in the United States during 1899 in the *Monthly Weather Review* for October last. The total number of reports received of buildings struck and damaged or destroyed by lightning was 5,527, or about three times as many as were received during the year 1898. In addition to the above, 729 buildings caught fire, as a result of exposure to other buildings that had been set on fire by lightning. The approximate loss in the 2,825 known cases was \$3,016,520, or an average loss of nearly \$1,100 per building. The number of insured buildings struck by lightning in the United States in 1899, according to the Chronicle Fire Tables, was 2,760, with an average loss of over \$1,400 per building. The great majority of buildings struck were not provided with lightning rods, as was the case in 1898; but 70 buildings provided with rods were also struck and damaged. Professor Henry concludes that a conservative estimate of the total loss of property by lightning during the year would probably be \$6,000,000.

RAINFALL AND ALTITUDE IN ENGLAND.—The Assistant Secretary of the Royal Meteorological Society, William Marriott, contributes a paper on the *Rainfall in the West and East of England in Relation to Altitude above Sea-Level* to the *Quarterly Journal of the Royal Meteorological Society* for October. The mean monthly and mean annual rainfalls at the English and Welsh stations were obtained for the ten-year period 1881-90, and the stations were grouped according to their altitude above sea-level. The annual rainfall being decidedly heavier in the western portion of the country than in the eastern portion, it seemed desirable to separate the western from the eastern stations. Those stations were classed as "western" which drain to the west, and those which drain to the east were classed as "eastern." The stations were then grouped together for each 50 feet up to 500 feet, and above that altitude for each 100 feet. The results show that there is a general increase in the amount of rainfall as the altitude increases. There are some irregularities at the higher altitudes, but these, Mr. Marriott thinks, are undoubtedly due to the small number of stations employed. The values when plotted show in a very striking manner that the rainfall is considerably greater in the west than in the east, the excess being nearly a quarter. When, however, the west and east values are combined, the curve becomes much smoother, the increase of rainfall according to altitude being much more uniform.

The graphic results show, further, that the monthly rainfall in the west is subject to a much greater range than in the east; and that in the west the maximum at all altitudes occurs in November (and not in January, as is popularly supposed), but in the east generally in October. One of the most marked features in all the diagrams, both west and east, is the great rise in the rainfall from June to July. The increase of rainfall with altitude is thus summarized by Mr. Marriott:

100 feet + 9 per cent.	600 feet + 5 per cent.
200 " + 3 "	700 " + 38 "
300 " + 3 "	800 " + 3 "
400 " + 14 "	900 " + 4 , "
500 " + 1 "	1,000 " - 21 "

#### ALTITUDE AS A SOLUTION OF THE ACCLIMATISATION PROBLEM.—

Once again comes the suggestion or implication—this time from Hon. Charles Denby (*Independent*, New York, December)—that the problem of the acclimatisation of the white race in the tropics can be solved by establishing residences and sanatoria at a few thousand feet above sea-level. Mr. Denby refers to the plateau of Benguet, in the northwestern part of the island of Luzon, which averages about 4,000 feet above sea-level, and up to which the Government proposes to build a railway. The existence of this province, in the opinion of Mr. Denby, will solve many of the questions which have arisen out of our possession of the Philippines, because it will furnish a fine sanitarium and a healthy location for the seat of government. While mountain and plateau stations make living in many parts of the tropics possible for the white man, for the reason that, with increasing altitude above sea-level, there is a general decrease of temperature and of humidity, yet one of the chief characteristics of tropical climates—viz., the monotony—remains as marked a feature aloft as at sea-level. It is the monotony of the climatic conditions in the tropics which is one of the difficulties with which a Northerner has to contend. The constant repetition, from day to day and from season to season (for the seasonal changes are, as a whole, very slight in the tropics), of the same conditions has a deadening, enervating effect, which cannot be counteracted by seeking a residence at a higher altitude. The spur of the seasons, which is so important an influence in giving the northern peoples their vigor and energy and "push," is lacking in the tropics. No mountain climate can supply this missing quality. Mountain stations are very important, because they do furnish some relief from

the excessive heat and humidity of the lowlands, and are above the zone of many tropical diseases; but they do not solve the problem of acclimatisation. The northern winter—disagreeable as it often is—has contributed much toward making our northern races what they are. Let us recognise clearly that tropical mountain stations are all-important in making life more bearable in the tropics, and in keeping white men and women free from many diseases that are prevalent in the lowlands; but let us also beware of overrating the value of these same high-level stations.

## GEOGRAPHICAL RECORD.

### AMERICA.

POPULATION OF THE KLONDIKE.—The census taken in May, last year, in the Klondike mining field showed 16,395 persons, of whom 14,834 were white men, 1,195 white women, and 366 Indians. The population included 9,534 Americans, 4,555 British subjects, of whom 3,000 were Canadians; 155 Germans, 146 Swedes, 107 Norwegians, and 101 French.

IRRIGATION IN COLORADO.—The *Monthly Weather Review* for November says that agriculture by irrigation has reached a degree of development in Colorado unrivalled elsewhere in the arid regions. There is no prospect, however, of its further extension under present circumstances. The amount of water now reaching the streams is smaller than a quarter of a century ago. Scarcity is common, and droughty conditions during the summer often cause great loss. Deforestation and forest fires have removed large tracts of timber, nature's reservoirs in the mountains, so that the amount of moisture conserved till midsummer is growing less under the unobstructed influence of the sun and winds.

### EUROPE.

GROWTH OF GERMAN CITIES.—The census of Germany is now taken every five years. The enumeration on December 1 last revealed remarkable growth of German cities since 1895. The transference of population from the country to the cities made more rapid progress in the past five years than at any earlier period. The population of Berlin is 1,884,345, a gain of 12.3 per cent. in five years. Nuremberg has made the most rapid increase. Situated at the convergence of several valleys, it is the meeting-place of seven large railroads, and one of the largest receiving and shipping points in South Germany. Its increase in population was over 60 per cent., or 90,357 in a total population of 260,743. The city of Posen is a striking illustration of the growth of manufacturing and the decline of agriculture. The province of Posen has grown very little in population for years, as the young farmers have flocked to the cities of Prussia to find employment in the factories; but while the province, as a whole, has languished, the city of Posen has grown more rapidly than any other, except

Nuremberg. Its population is 116,151, an increase over 1895 of 58.6 per cent. The population of Stettin is 209,988, an increase of 49.2 per cent.; of Mannheim, 140,384, an increase of 43.6 per cent.; Hamburg has 704,069 population, increase 79,117; Munich, 498,503, increase 87,502; Leipzig, 455,120, increase 55,126; Breslau, 422,415, increase 49,246; Dresden, 305,349, increase 58,909; Cologne, 376,085, increase 49,121; Frankfort-on-the-Main, 287,813, increase 58,534; Chemnitz, 206,584, increase 45,567; and Halle, 156,503, increase 43,027. Seventy years ago about four-fifths of the population living in the states that now compose the German Empire were engaged in agriculture. For fifteen years, however, the transformation of Germany from an agricultural to an industrial nation has made steady progress.

CANALS IN HUNGARY.—The plans for the new canals, projected by the Hungarian Government, have been submitted to the House of Deputies, which is expected to vote the money required to build them. One of them is to connect the Theiss and Danube rivers, saving about 400 miles of navigation and giving the upper Theiss valley a short water route to Budapest. The Schamatzer canal, which is to be dug between the Danube and the Save, will shorten the water route from the upper Save to Budapest about 250 miles. The third project is to connect the Waag and Oder systems, thus giving a water connection between Germany and Hungary.

#### AFRICA.

STEAMERS ON THE UPPER CONGO.—The first steamer was launched at Stanley Pool, on the Upper Congo, twenty years ago. There are now 103 steamboats plying on the Upper Congo and its tributaries, or preparing in the shipyards at Stanley Pool for launching. According to *Le Mouvement Géographique*, Belgian enterprise has placed nearly half of these vessels on the river—the fleet of the Congo Free State numbering twenty-nine, and that of the Belgium trading companies nineteen steamers. In the past two years the French have sent thirty-nine boats to Brazzaville, on Stanley Pool, and most of them have been launched. The Dutch traders own ten vessels, the Germans two, and English and American missionary societies have four steamers in their service. Within the past two years half of the Upper Congo fleet has been carried on the cars to Stanley Pool. A month was formerly required to transport a steamboat, carried in sections on the backs of porters, around the rapids in the Lower Congo; but a steamboat is now carried over



the route in two days. Thus both railroad and steam vessels are working together in the commercial expansion of the country.

MAIL SERVICE BETWEEN THE BAHR-EL-GHAZAL AND EUROPE.—Postal communications have been opened between Europe and the Bahr-el-Ghazal, in the southern part of the Nile basin. Mails from the Belgian post at Lado, on the Upper Nile, have arrived in Belgium in twenty-nine days. An English gunboat is plying regularly between the Bahr-el-Ghazal, Fashoda, and Khartum, where it connects with the railroad to Cairo. Thus regular steam communications have been established between equatorial Central Africa and Europe (*Revue Française de l'étranger et des Colonies*, Oct., 1900).

DWARFS IN THE CONGO FORESTS.—The *Geographical Journal* (Jan., 1901) says that Sir Harry Johnston, in July last, crossed the Semliki river and entered the Congo Free State to transact some business with the Free State officials. He improved the opportunity to restore to their homes in the Congo forest a number of dwarfs who had been kidnapped by a German for the purpose of sending them to the Paris Exposition. He made many photographs of the dwarfs he met in the forest, and of their implements and dwellings. They were of two types—black skinned, with a good deal of stiff, curling black hair about the body; and red, or yellow skin, with a tendency to redness in the hair of the head. The explorer believes these dwarfs no longer speak an original language, but talk, in a slightly corrupted form, the language of the taller negroes near whom they live. In speaking the languages of surrounding tribes the dwarfs introduce into their pronounciation "hiatuses," which bear a strong resemblance to the clicks of the Bushman and Hottentot. They also speak in a curious and very marked sing-song. Their intelligence is well developed, and, though ugly in features and often ape-like in appearance, they are usually of winning and cheerful disposition. Their dances are so frolicsome and gay and so full of pretty movements as to distinguish them, in this respect, from the average negro.

#### ASIA.

THE QUESTION OF LOB-NOR.—When Dr. Sven Hedin reached a telegraph office, late last year, he sent this message to Sweden: "The Lob-nor question is solved." The details of his investigation in this part of Chinese Turkistan have recently reached Sweden in a long letter from the explorer. Lake Lob is shown on old Chinese maps as a large salt lake among the sand-wastes north of the giant

Altyn-Tagh range. The lake receives the waters of the long Tarim river, and some other streams. The Russian explorer, Prjevalsky, reaching Lob-nor in 1876, found it considerably south of the position assigned to it by the Chinese, and attributed the fact to the inaccuracy of the Chinese maps. After Dr. Hedin visited the lake, in 1896, he published in *Petermanns Mitteilungen* a series of nine maps, showing that the Chinese had assigned different positions to the lake at various times, these positions lying approximately north or south of one another. He advanced the theory that the lake is not stationary, but within the past few centuries has moved about forty miles to the south, and is now moving north again. This theory was discredited by Russian geographers, who accepted Prjevalsky's view that the Chinese charts were untrustworthy. On his visit to the lake last year Dr. Hedin discovered, to the north of the present lake, the bed of the lake as it is marked on the Chinese maps of the eighteenth century. He was twelve hours in crossing this old bed, which consists of horizontal layers of mud-banks, in which there are millions of shells of salt-water mussels, showing that this sterile ground once teemed with life. Hedin's explanation of the migration of the lake is that which he advanced after his first visit. He says that the region where the waters accumulate is now practically on a dead level, and it requires only the formation of mud-flats or sand-dunes, a little above the general level, to change the position of the main water receptacle.

#### AUSTRALIA.

THE COMMONWEALTH OF AUSTRALIA.—The Australian colonies on January 1 last became States in the Commonwealth of Australia. The nation thus formed shares with the United States a distinction that until now has been held by this country alone. Australia's resources are so large and varied that it may reasonably expect in time to become, in most material things, a self-sufficing nation. Owing to its vast extent, Australia embraces every variety of climate, except that found within the Polar circle. It can grow most of the vegetable and animal products of the temperate, sub-tropical, and tropical regions. It is given only to two nations—the United States and the Commonwealth of Australia—to be able to produce nearly all the commodities they need.

#### NOTES ON COMMERCIAL GEOGRAPHY.

France's wine crop in 1900 was the fourth largest crop ever produced in that country. The amount was 1,721,000,000 gallons.

It would have been larger if the heavy rains of September had not destroyed the grapes on many thousands of acres. Periodicals devoted to the interests of the wine-growers are advising that attention now be paid to quality, and not to the quantity. Consul Covert writes from Lyons that there are reasons to believe that the acreage planted in vines will not be increased.

The statistics just published by the Merchants' Union Silk Syndicate of Lyons, France, show an increase of about 4,000,000 pounds of raw silk a year in the three years ending in 1899, and a total production of 38,300,000 pounds in 1899. These figures, however, include only the export product of China, Japan, and Persia. These countries retain enormous quantities of raw silk for home manufacture, and the total product for the year 1899 is estimated at 60,000,000 pounds.

In 1897 artificial indigo was brought upon the market at a price that enabled it to compete with the indigo raised in the Bengal province of Behar, the chief region of indigo culture. Dr. Brunck, in a recent lecture in Berlin, said that the growth of the manufacture of artificial indigo in Germany has been so enormous that 250,000 acres of land in India are required to produce as much indigo as is now manufactured annually from coal-tar by one company in Baden. The artificial supply seems likely to drive the natural product from the market. In the effort to avert the destruction of the Behar indigo industry the British Government has recently ordered that all the blue cloth supplied to the army and navy must be dyed in natural indigo.

The free-trade policy that Russia has long maintained in Siberia came to an end in January. The heavy duties levied in European Russia will be imposed at the Siberian frontiers and ports. A short free list, however, will include cereals, as eastern Siberia does not raise all the grain needed. Agricultural machinery will also be free. The free-trade policy has been abandoned because Russia believes that, with the completion of steam communications overland to Vladivostok, Russia may herself supply the needs of eastern Siberia, to the exclusion of foreign commodities.

#### POLAR REGIONS.

The Swedish party, led by Mr. Gustav Kolthoff, report the results of their voyage last summer for the study of the Arctic fauna.

They left Norway on the 4th of June, and made their first stop at Spitzbergen.

They explored Prince Charles Island, and then steamed along the edge of the impenetrable Polar ice towards the coast of East Greenland as far south as the island of Jan Mayen, reaching Greenland on the 31st of July, at Mackenzie Bay. The ground was bare of snow, and vegetation was vigorous.

August 14 the vessel entered Franz Josef Fjord, which was free of ice, and there the party remained for ten days, making collections, and capturing alive two young musk oxen, which have been safely landed in Sweden.

The eastern coast of Greenland, which is ordinarily blocked by ice, was found to be almost free during the past season.

## PHYSIOGRAPHIC NOTES.

BY

RALPH S. TARR.

GLACIATION IN ALASKA.—Thanks to the discovery of gold in Alaska, we are now learning a great deal concerning the geology and physical geography of that far-distant territory. For example, Part VII of the Twentieth Annual Report of the United States Geological Survey, a volume of over 500 pages, is devoted to reports of explorations in Alaska by Messrs. Eldridge, Spurr, Mendenhall, Schrader, and Brooks. While in some parts there seems to be need of editing, for the elimination of interesting but decidedly unimportant narration of experiences, there is a great amount of important material in each of these reports. They are, moreover, finely illustrated with excellent half-tones and maps, giving one many clear pictures of conditions in the parts of Alaska visited. Being in the nature of reconnaissance reports, much of the material is in a form of narration that would be difficult to summarize. Many points of physiography are brought forward, but perhaps the portions of most general interest are those relating to the evidences of past glaciation.

For example, Spurr's report upon Southwestern Alaska, including much of the Yukon valley, and reaching eastward to Cook Inlet, contains a rather full statement of the evidences of glaciation. The mountains were formed during the Tertiary revolution, then very decidedly lowered so as to admit the sea far inland and up to levels of fully 3,000 feet above the present shore-line. The evidence of this is found in the presence of rock-cut terraces and extensive deposits of Pleistocene gravels, which rest unconformably on the underlying folded mountain rocks. That the elevation to the present level was slow and intermittent is indicated by successive terrace-levels lower than the upper one. The evidence seems conclusive that these Pleistocene gravels are marine, and that at the time of their formation glaciers existed in the mountains, discharging icebergs into the sea.

With regard to former glaciation, Spurr says:

There has been no general glaciation of southwestern Alaska, and if what glaciation there was constituted the Glacial period, then Alaska is still in it. For the evidence of ice action, shown in the deposits, the writer, as before stated, is inclined to look very largely to shore ice and to river ice, for these are undoubtedly very powerful eroding and transporting agents.

That there has been no general glaciation is indicated by the fact that, side by side with valleys containing glaciers, and in which they were formerly only slightly more extensive than now, are other valleys containing convincing evidence of never having been glaciated. Only valleys that are broad and U-shaped and that contain well-defined cirques are at present occupied by glaciers. In front of the existing glaciers are the sea-formed gravel deposits, mentioned above, which include boulders dropped by bergs. The glaciers did not reach below the ancient shore-line, apparently breaking off and forming icebergs, and thus ending in the sea. Since that time the advance of glaciers has been only slightly greater than at present, so that, from the beginning of the Pleistocene to the present time, the glaciers, according to Spurr, have been of about the same extent as those now existing there.

It is to be noted, however, that this does not preclude the possibility of a former very decided difference in climate; for the evidence seems to point toward a much lower stand of the land in this region when glaciation involved the more eastern parts of the continent. It would seem, then, that the uplift of the land was coincident with the change from the glacial climate to that of the present, so that there was at no time a condition of both climate and land elevation favoring general glaciation.

Mendenhall, on the other hand, whose territory includes a quadrangle to the east of Cook Inlet, comes to a rather different conclusion, as is indicated by the following quotation:

Throughout the entire region studied the explorer is constantly confronted with evidence to prove that the present glaciers are but remnants of a system of vastly greater extent. Glacial scratches, polished surfaces, erratic boulders, typically glacial topographic features, nearly all of the usual forms of evidence, are abundant. It is difficult to decide just how extensive the older system was, but the conclusion reached is that a general ice-cap has not at any time buried this part of the continent, but rather that the greatest advance, of which records remain, was an expansion of the present system, essentially alpine, with its centres of accumulation, as now, in the two great ranges—the one along the coast, the other in the interior—and that from these centres ice streams flowed down the valleys, and spreading, fan-shaped sheets, of the type which Professor Russell has called Piedmont glaciers, rode out over the adjacent lowlands.

Such differences in deduction from observation bring up the interesting question as to whether the facts are actually different on the southern coast from those in the Yukon valley, or whether the difference in conclusion is the result of the interpretation which the observer places upon the facts. For example, is the evidence of glaciation in the Yukon valley buried beneath the gravel de-

posits? Or, on the other hand, are some of Mendenhall's evidences of former glaciation to be ascribed to the action of floating ice?

Schrader's report, which is based upon observations in the Copper River valley, also describes sea-deposited gravels of recent origin, and unconsolidated, reaching to elevations of 2,800 or 2,900 feet. His conclusion is that glacial activity was formerly much greater than at present. Brooks' reconnaissance included the Tanana river and a portion of the White river, upper tributaries of the Yukon. He finds no evidence of general glaciation in the Yukon, such as that noted by Dawson, McConnell, Russell and Hayes, although glacial deposits are found associated with the gravels which occur in his territory as in that of the others. A glacier once occupied the White River valley; but the glaciers of the Tanana valley and its tributaries appear to be of the Piedmont type, like that of the present Malaspina glacier in the Mount St. Elias region. He concludes that glaciers formed "a comparatively unimportant part in the physiographic development of the region," but that they did contribute silts and gravels, and also helped to bring about some drainage modifications.

From these various reports it seems difficult, as yet, to arrive at a definite conclusion concerning glaciation in Alaska, although the evidence as a whole seems to support the belief that, while glaciation did not extend over the entire territory, there were many glaciers, in some portions at least, which were decidedly larger than at present, broadening on the lowlands to the Piedmont condition. The results of further more detailed work will be awaited with interest.

These Alaskan reports contain many facts and suggestions concerning other features of physiographic nature. For example, Brooks describes the even sky-line which the mountain crests reach; and this, he concludes, indicates decisively the former existence of a peneplain whose exact age is doubtful, though somewhere in the Tertiary time, during a long period of stability of land. Rock benches found on valley sides are interpreted as the river bottoms of former time. His interpretation of the topography of this mountainous region, whose irregularities are accounted for by warping and by monadnocks, would be much more convincing if it had been accompanied by a consideration of the alternate hypothesis of the lowering of the mountain crests to a measure of sub-equality. The acceptance of a peneplain explanation for so rugged a region should require the most convincing evidence.



GLACIATION IN SIBERIA.—Another region that has been little studied in the past, and the question of whose glaciation is of great interest, is that of Siberia. The evidence from that vast area has been somewhat conflicting, and it is therefore of interest to record the note upon the subject which Purington has published in the *American Geologist* for January, 1901 (XXVIII, 45-47). Purington has spent three seasons in Siberia, during which time he has been on the outlook for evidence of glaciation. He finds that the lakes are not due to glaciation, but are merely remnants of former larger lakes. Deceptive imitations of evidences of glaciation frequently led him for the moment to consider that he had found signs of former glacial action; but upon study these were soon proved to be mere imitations. As a result of three years of travel, he records the fact that but one genuine instance of a fair-sized area of glaciation was found—namely, in the Yenisei valley, about fifteen miles southeast of Krasnoyarsk, in southern-central Siberia. There an area of about a hundred square miles, enclosed by a high granite wall and sedimentary rocks, contained abundant signs of local glaciation, among them drumlins, well-developed cirque topography, and a sand plain, but no scratched pebbles. Evidences of glaciation were found among the Altai mountains, where glaciers still exist; but the gold gravels of eastern Siberia, which by some have been ascribed to glacial action, were found to be not due to that cause.

These observations of Purington give support to the belief that general glaciation did not exist in Siberia, not so much because of the absence of a glacial climate as to the lack of high gathering grounds for the ice, together with the distance from the sea, which would prohibit extensive precipitation. That the climatic conditions were otherwise favorable for glaciation is suggested by the former extension of glaciers among the high mountains of central Asia, and also by this area of local glaciation, where the area of high land favored the gathering of snow.

ORIGIN OF YOSEMITE VALLEY.—Turner (*Proc. Cal. Acad. Sci., 3rd Ser., Vol. I, 261-321*), after sketching the history of the Sierra Nevada, in the vicinity of the Yosemite, takes up the discussion of the Yosemite Valley. He finds some evidence, though not absolutely conclusive, of two glacial periods. In considering the origin of this remarkable valley he discusses the various theories, but finds himself neither able to accept the Muir explanation, of glacial erosion, nor the Whitney explanation, of origin through block-

faulting. His conclusion is that it is not unlike other cañons, the world over, in being due primarily to *stream* erosion, aided, in this case, by the influence of the marked joints of the rock. According to Turner, cañons cut in the inter-glacial epoch were modified by the ice advance of the second glacial epoch.

In review of Turner's paper, Gannett (*Nat. Geog. Mag.*, *XII*, 1901, 86-87) vigorously asserts glacial origin, pointing out that there is an abundance of evidence of marked glacial action in this part of the Sierra Nevada, in the form of bare, rounded granite surfaces, U-shaped cañons, thousands of lake basins, and many cirques and hanging valleys. That this glaciation was long continued, and effective in its work, Gannett states, can be seen at a glance; and, moreover, that the line of demarcation between the channel and glacial erosion is clearly marked. Hanging valleys occur on the margins of the Yosemite Valley, and the Merced Valley changes abruptly to a V-shaped gorge at the foot of the Yosemite Valley. Gannett's conclusion, quite in contrast to that of Turner, is that the Yosemite is an ordinary and necessary product of *glacial* erosion.

ISLANDS OFF THE COAST OF SOUTHERN CALIFORNIA.—Partly through a study in the field, and partly from a study based upon the excellent United States Coast Survey maps of these islands, W. S. Tangier Smith (*Bull. Dept. Geol. Univ. of California*, *II*, 1900, 179-230) discusses the origin of the peculiar topographical features of the several islands lying off the California coast. Throughout this region there was land depression during the Miocene, followed by a period of erosion, during which the land was more elevated than now. A marked unconformity between the Miocene and Pliocene is proof of this erosion period. During the succeeding Pliocene depression the Miocene valleys were filled more or less, though much of this filling has since been removed.

During the post-Pliocene time some of the islands were mountain masses forming part of the mainland. Later folding, some occurring in the Pliocene, affected the whole region and formed some of the islands, as, for example, San Clemente. These mountain-building forces have acted intermittently down to the very present, and have included both faulting and folding; but the later movements have been of minor consequence in comparison to the earlier. In consequence of the movements, which at times have approached the condition of oscillation, there were local differential uplifts and downsinkings, as, for example, that which formed the San Francisco

Bay. During the Pliocene depression the land stood fully 1,500 feet below the present level, and this stand was long enough to permit the waves to cut off the tops of some of the islands. The post-Pliocene uplift, perhaps, connected the northern islands with the mainland; but the evidence indicates that the southern islands were not so connected. A slight, recent depression is shown by drowned valleys.

The paper is partly devoted to a discussion of the physiographic features of the sea-formed terraces, drowned valleys, and the stage of stream development. Smith states that a future more detailed study of the geology—which he believes is needed—may modify some of the details; but that the main object of his paper is to bring forward evidence that the latest general land movements on the islands have been the same as those on the neighboring mainland.

## CERROS, OR CEDROS ISLAND.

A NOTE BY GUSTAV EISEN, PH.D.

The comparatively large island situated on the west coast of Baja California, Mexico, at the intersection of W. Long.  $115^{\circ}$  and Lat.  $28^{\circ}$ , is variously known as Cerros and Cedros. On the U. S. Government charts the island is always marked "Cerros." This is also the case on most English and French maps. Mexican and some American navigators call the island "Cedros," though the former name is not entirely unknown on account of the American charts, which are the ones generally in use. The first person to call my attention to the existence of the two names was Captain John von Helms, one of the most well-known seafaring men on the whole Pacific coast, than whom no one is better acquainted with the nomenclature of the coast of Baja California. I was at that moment engaged in constructing two maps of Baja California to accompany my biological reports on that peninsula. The local map referred exclusively to the Cape region, or southern extremity of the peninsula, while the other was a general map of the whole country. Captain von Helms stated that the name Cerros was almost unknown, or at least not in use, and that it had probably originated from misspelling or from ignorance of the chart-makers. Such errors in misspelling are common on all charts relating to Mexico. It would be easy to substitute an *r* for a *d*, and this would account for the change in name. As will be seen, however, the U. S. Government map-makers were this time not at fault, for the name Cerros is older than the United States. Having no opportunity to investigate the matter at the time, I accepted Capt. Von Helms' verdict and placed the name Cedros on the new map (published by the California Academy of Sciences of San Francisco, 1895). Captain Von Helms argued, moreover, that the name Cerros, meaning "hills," and all the islands on the coast being hilly, there was no sense in calling any one island by that name. The existence of cedars on the island seemed to justify the name Cedros. Last year I had occasion to construct a new map (published recently by the American Geographical Society), and on this map I was induced by the Mexican Government Surveyor at Ensenada to retain the name Cerros and discard Cedros. The Surveyor declared that there were no cedars on the island. He had been there several times and had found pines, but no cedars. The island, he said, was unusually hilly, and the name Cerros would be quite appropriate. I restored the name suggested by him and recorded the island as Cerros. I thought, however, it would be of some little interest to investigate the matter. My first inquiry was from the people living on the coast of Baja California, and from them I learned that the island was generally known as Cedros and that the name Cerros was never used, though it was known on account of the foreign maps. This alone would justify the dropping of the name Cerros. Having since studied the historical side of the question, I have thought that others might be interested in knowing the conclusions to which I have come.

The island of Cedros (for this is its real name) was first seen by the Spanish navigator, Francisco de Ulloa, who landed on the island January 15th, 1539. Ulloa says of his visit to the island: "They (the hills) were high and on the top of each were many tall, slender trees. The island was twenty leagues in circuit, and was afterwards named 'Isla de Los Cedros.'" From Ulloa's account we also learn that the island was densely inhabited by Indians, with whom Ulloa and his sailors came in conflict, his dog Berecillo, for instance, being badly beaten by the savages. These

latter used canoes made of trunks of cedar trees. The trunks were not hollowed out, but were simply lashed together like rafts. There were groves of cedars on the north side of the island, and the name was given on account of them. From Ulloa's relation, it is evident that the priority belongs to the name Cedros, the one now most in use. While this may be considered as settled once for all, not a little interest is attached to the history of the name Cerros.

After Ulloa the island was visited by Sebastian Viscaino, who landed there August 31, 1602. Viscaino refers to the island as *Isla de Cerros*. This is unaccountable, as several maps already published gave the name Cedros Island; notably so the Forlani map, published 1574. On this map we read plainly: "Y. de Cedri." On the globe of Molineaux of 1592 we find the island indicated by the same name, etc. We must suppose that Viscaino either had no previous knowledge of these charts, and that he had not carefully read the account of Ulloa, or that his scribe made an error in writing and substituted *r* for *d*. It may be, however, that Viscaino actually changed the name and thought that "Cerros" would be more appropriate. The following table gives some of the various names of this island from early times to the present day:

- 1539. Francisco Ulloa, discoverer: "Isla de Cedros."
- 1574. Forlani map: "Y. de Cedri."
- 1589. Map of Abt. Ortelius: "Islas de los Cedros."
- 1592. Globe of Molineaux: "I. de Cedri."
- 1594. Map of Petrus Plancius: "I. de Cedros."
- 1602. Sebastian Viscaino, landed on the island: "Isla de Cerrós."
- 1625. Henry Briggs map: "I. de la Carre."
- 1628. Gerhard Mercator (Atlas Minor): "I. de los Cedros." Marked too far north.
- 1700. Guillaume Delisle: "I. Des Cedres."
- 1720. Stockholm chart: "I. de Ceros."
- 1722. Guillaume Delisle map: "I. de Cedros."
- 1732. Sigismund Taraval, who landed on the island, found that the natives called the island "Amalgua," meaning the island of fogs.
- 1743. Map of Capt. Anson: "Isla de Peros."
- 1900. U. S. Government charts: "Cerro Island."
- 1900. Native name by Mexicans in the vicinity of the Island: "Isla de Cedros."

This list calls for a few remarks. The name on the map of Briggs, "I. de la Carre," is undoubtedly taken from the form of the island, as seen from the south. "Carre" is in French the word for a tall, pointed hat of the style used by the Mexicans, and the island, with its high southern peak, has an undoubted resemblance to such a hat. Delisle, who introduced so many improvements and made so many corrections in the maps of his time, also restored the original name to the island. The names "Ceros" and "Peros" on the other charts are probably due to error in writing. The chart of Capt. Anson is full of similar or worse errors in spelling, as, for instance, "Maria Hermosos" instead of "Morro Hermoso." "Morro," meaning a rounded prominent cape, is one of the most common geographical words in Spanish-speaking countries. The United States Government surveyors probably copied the name from older charts, and had little opportunity to make inquiry among the natives on the Pacific coast of the peninsula. The same may be said of the British surveyors. On French maps the island is generally called "Cerro." Now we come to the question whether the name "Cedros" is justified or not. The northern point, as well as a large part of the high backbone of the island, is sparsely covered with coniferous trees. The largest

of these is a species of pine—*pinus muricata*. It is everywhere a rather small tree, but sometimes sufficiently large to be used for canoes; and we are told that the Indian canoes were made of whole trunks tied together and not hollowed out. There is an abundance of real cedar growing on the northern part of the island, though the trees are very small, and might even be designated bushes. This tree is known as *Juniperus Californica*, and was called by Kellogg *Juniperus Cerrosianus*. Even in New England junipers are often known as cedars. Whether Ulloa actually mistook the large pines for cedars or had branches brought him by his men, who climbed the hills; is not known. The fact remains that cedars are actually found on the island, and that thus the name is not misapplied. In the mountains of Alta California this juniper often grows to a large size, and might be turned into a hollowed-out canoe. In Ulloa's times some of the junipers on Cedros Island may have been larger than now. The island has been little explored, and it is probable, or at least possible, that even at present there are favored nooks where larger junipers are found.

To sum up, I think that we are fully justified in retaining for this island the name of Cedros and in dropping the name Cerros. The reasons for this are as follows:

1. The discoverer of the island, Francisco de Ulloa, gave the name "Isla de Cedros."
2. Cedars are actually found on the island.
3. The island is at present known to the vast majority of Mexicans as "Isla de Cedros."
4. Many of the captains plying between San Francisco and the southern ports recognize the error on the United States Government charts and designate the island as "Cedros Island."

In addition to the above, I may state that, according to Mr. T. S. Brandegee, the well-known botanist and explorer of Baja California, the cedar so extensively exported from "Tres Marias Islands," south of the peninsula, does not belong to the coniferous trees, but to a different family—the Meliaceæ, the genus name being *Cedrela*. This only shows that the Mexicans apply the name cedros to widely separated genera. The *cedrela* is not found on Cedros Island.

## THE COOSA RIVER.

BY

FREDERICK G. BROMBERG.

In the early days of the Republic, before the invention of railroads, public attention was directed to the waterways of this country, both internal and along the sea-coast lines, as means of communication and ways for commerce between the widely separated territories composing the United States.

It was then, in the twenties, that surveys were made for an interior water route along the coasts of the Atlantic Ocean and the Gulf of Mexico, including one for a canal across the peninsula of Florida, as a part of that proposed system. It was then that the Coosa River occupied a prominent place in all water-way schemes, and was a well-known feature of American geography.

Prior to 1823, the Legislature of Alabama passed a bill to improve the navigation of the Coosa River and to aid in its connection with the Tennessee waters. In 1824, this act was formally approved by Congress. In 1828, Congress provided that any surplus of the grant for improving the Tennessee River should be applied to the improvement of the Coosa, Cahawba and Black Warrior Rivers.

The original project for the improvement of the Coosa River contemplated the opening of a continuous water route of transportation from the Mississippi River to the Atlantic Ocean, by way of the Ohio, Tennessee, Coosa, Etowah, Ocmulgee and Altamaha Rivers, with canals from the Tennessee to the Coosa, and from the Etowah to the Ocmulgee. This was designated as the Southern route.—(*Memorial Coosa River Imp. Com., Sept. 27, 1899, p. 5.*)

In proportion as railways developed into large systems, binding together the distant parts of the country by roads capable of rapid transportation, these water-way projects dropped out of mind, and the Coosa River seems to have been so far forgotten that recently in the State of Massachusetts a Superintendent of Education, upon being requested by the Congressman of his district to introduce into the papers for a competitive examination for an appointment to the U. S. Military Academy at West Point questions relating to the Coosa River, replied by asking the Congressman, "Where is the Coosa River?" Judging from what we saw on a recent trip down the river from Rome, Georgia, to Lock No. 4, 35 to 40 miles below Greensport, the river has been forgotten in Alabama and Georgia as well as in Massachusetts.

It is unfortunate for both the Alabama and the Coosa Rivers that



they ever had distinctive names. They are in fact one and the same river, and it is impossible to see any physical demarcation at the point where the change of name occurs. Had the name Alabama been given to the joint rivers, throughout their continuous length, there would have been one noble water-way of 863 miles, from Tennessee to Mobile, at its mouth, which now is apparently broken up into three disjointed pieces, known as the Oostanaula for 108 miles above Rome to the southern edge of the State of Tennessee; as the Coosa River for 315 miles, from Rome, in Georgia, to Wetumpka, in Alabama; as the Alabama River from Wetumpka to the mouth of the Tombigbee River, 390 miles, and as the Mobile River from the latter point, 50 miles to the Bay of Mobile.—(*Mem.*, Sept. 27, 1899, p. 4.)

There is but one serious obstacle to the unity of this great river, namely, a series of rapids about midway of its length, stretching over about 142 miles, along which the river falls about 400 feet, or three times as much as the fall of the Niagara River. It is this obstruction which it is proposed to overcome by 36 locks, 3 of which have been completed at the upper end, and one nearly completed at the lower end, whilst a fourth at the upper end was begun several years ago, but work upon it stopped for want of appropriations by Congress, and is now a picture of ruin and decay, and a striking objection of the folly of spasmodic appropriations as a means for executing a great plan of internal improvements. Let us hope that the recent visit of the Rivers and Harbors Committee of the House of Representatives to the locks will result in wiser and more scientific methods.

Whilst it is true that all four rivers—the Mobile, Alabama, Coosa and Oostanaula—form one, yet each has its own distinctive territory, different from the others, and my duty is more particularly to set forth those of the part known distinctively as the Coosa River.

The Coosa Valley, in Alabama, is nearly 10,000 square miles in area, of which about one-half is of coal measures.—(*Geol. Surv. Ala.*, 1897. *Report on Valley Reg.*, Part 2, *The Coosa Valley*, p. 1.)

#### MINERAL RESOURCES.—

The mineral resources of this region are great and varied. It, with the metamorphic belt to the southeast, might, with a good deal of propriety, be called *the mineral repository of the State*. It includes in very large quantities, and of good quality, some of the most important of all mineral substances. The importance and value of any mineral substance is strictly dependent on its quality, quantity and accessibility. The chief or most valuable mineral substances are stone coal, iron ore, aluminum minerals, barite, manganese, lead ore, gold, marble, building stones, paving stones, curbing stones, slates, millstones, grindstones, whetstones, lithographic stones, road and ballast materials, hydraulic cement rocks, mineral paint, tripoli or polishing powder, sands, mineral waters, etc.—(*Id.*, p. 59.)

Mica, which the development of electrical machinery has raised to the highest importance, ought to be added to this list of the mineral riches of the Coosa Valley.—(*Geological Survey, Ala., Bull. No. 3, Lower Gold Belt, pp. 17, 23, 27, and Bull. No. 5, Upper Gold Belt, pp. 118, 119.*)

#### AGRICULTURAL RESOURCES.—

The soils of the Coosa Valley region are of three general classes. 1st, calcareous sandy red loams; 2d, slightly calcareous gray sandy soils; 3d, highly calcareous clayey soils.

Of these, the first, calcareous sandy red loams, cover 2,000 square miles; the second, slightly calcareous gray sandy soils, which are based on or overlies sandstones, sandy shales and chert, cover over 7,000 square miles; the third, highly calcareous clayey soils, cover nearly 1,000 square miles. (*Geol. Surv. Ala., 1897; Coosa Valley Region, p. 105.*)

#### AGRICULTURAL FEATURES AND TIMBER.—

The agricultural capabilities of this region are very great, notwithstanding that over 1,000 square miles of its area are in broken mountains, ridges and hills, and over 7,000 square miles of its area are of naturally very poor sandy and siliceous soils. The principal crops of this region, as a whole, are Indian corn, cotton, oats, sorghum, millet, wheat, field peas, sweet potatoes, etc., with some clover and grasses. . . . The soils and climate, however, are suitable for a much greater diversity of crops. The winters are so slow of approach that frequently the crops are not all gathered until about Christmas.

The timber is still in many places in large forests of soft and hard woods. Lumbering is therefore now, and will be for many years, one of the greatest industries of this region. According to Dr. Chas. Mohr, the highest authority in the State, the native arborescent growth comprises over 125 species, and the grasses that grow without cultivation over 150 species, and the plants of more or less nutritious value that are relished by stock and that are suitable for forage and heavy crops are over 50 in number.—(*Geol. Surv. Ala., 1897; Coosa Valley Reg., p. 107.*)

(1) *Agricultural features and timber of the calcareous sandy red loams.* These are pre-eminently the farming lands of this region. They are not only naturally fertile and rich in all plant food, but they are also susceptible of the greatest improvement and are most retentive of all manures placed on them. They, as a general thing, lie well and do not wash badly. They, therefore, if properly cared for, ought not to wear out, but ought to improve with age or cultivation. Their timber is large and well shaped, but there is very little of it left, as nearly all of their lands have been in cultivation for a great many years.

(2) *Agricultural features and timber of the slightly calcareous gray sandy soils.* These soils, though, as a general thing, naturally poor, being deficient in organic matter and lime, are fine horticultural, fruit and grape-growing soils. They grow especially well almost all kinds of root crops, and they make fine natural pastures. They are well drained and often so lie as to be susceptible of great improvement. By the frequent light applications of suitable composts, they, in many localities, become very desirable farming lands. They are still covered for the most part by their native growths.—(*Ib. 108, 109, 110, 111.*)

## THE CLIMATE.—

This region lies between latitudes 32 deg. 55 min., and 34 deg. 50 min. Its climate is mild and equable. It never experiences the extremes of heat and cold of some of the more northern States. It is never too hot during the summer, nor too cold during the winter, to stop out-door work. The summers, though long, rarely ever reach a temperature of 100 deg. F., the mean summer temperature being about 75 deg. F. . . . The winters are short and comparatively mild, the streams of running water never freezing over and ice seldom forming over one inch in thickness, and the snow rarely falling to a depth of over a few inches, rapidly melting. The mean winter temperature is about 42 deg. F.—(*Ib.*, 113.)

## WATER-POWER.—

The water-power of the lasting streams of this region is great. There are few of the streams that would not give 8 to 10 feet head of water every few miles, to say nothing of the shoals and water-falls of considerable height that occur along many of them. These streams, with their abundance of water and rocky bottoms and sides, present, at many of the shoals and waterfalls, splendid sites for the erection of machinery of vast magnitude.

The shoals and waterfalls are perhaps the most numerous and greatest along the streams as they pass over the hard strata of the coal measures and Talladega slates, though they are made by the hard strata of all the formations. . . . The Coosa and Warrior Rivers, alone, if bridled as they leave this region, would doubtless give enough electric power to easily run all the machinery of the State.—(*Ib.*, 112, 113.)

## RAIN FALL.—

This region is highly favored with abundance of rain and freedom from drouths. Rainy spells and drouths are seldom of long enough duration to seriously affect the agricultural interests. The mean winter rainfall, with melted snow, is about 15 inches, and the mean summer rainfall is about 12 inches.

Lasting springs and wells and streams are common in nearly all parts of the region. It is, therefore, with few exceptions, blessed with an abundance of good water the year round for man and beast.

## DRAINAGE.—

The drainage of this region, except in a comparatively few places, is good outside of the *flat woods*. The streams, as a rule, have rapid currents. . . . Much the greater part of their courses are from northeast to southwest, the drainage being almost wholly toward the southwest.—(*Ib.*, 114.)

## THE FLAT WOODS.—

The Coosa River, from Rome southwest to . . . Gadsden, swings back and forth across the broad level valley that has been cut in the soft calcareous shales and limestones of the Cambrian. The actual flood plain is not extensive and the highly contorted shales are generally exposed along the banks of the river. The country back from the alluvial flood plain is poorly drained and heavily timbered, and to this the term "*flat woods*" is applied.—(*Geol. Surv. Ala.*, 1892, *Bulletin No. 4, N. E. Ala.*, p. 20.)

## COAL MEASURES.—

The coal measures of the Coosa coal field are found in the Counties of St. Clair and Shelby.

The coal field in Shelby County covers an area of 110 square miles; the thickness of the measures is 2,000 feet.

The coal field in St. Clair County covers an area of 145 square miles, also with a thickness of 2,000 feet.

There are three workable seams, ranging in thickness from three to four feet. The coal appears to be well suited for coking purposes. A seam of coal, reported three feet in thickness, was struck in the Coosa River in blowing out the channel to Lock No. 2 in the S. E. corner of Section 24, T. 14 N., R. 5 E.—(*Geol. Surv. Ala., Coal Measures of the Plateau Region*, pp. 220, 221.)

The extent of this Coosa coal field is entirely through St. Clair County, a distance of 34 miles, and 24 miles into Shelby County, or an aggregate length in all of 60 miles.

Its breadth is very irregular. Gibson considers that 345 square miles is a close approximation to its productive area.—(*Geol. Surv. Ala., 1895, Coosa coal field*, p. 9.)

This coal field is very narrow in proportion to its length, averaging less than six miles wide, and bordered on both sides by valleys of elevation, with high marginal rims or bordering mountains; it is hence, necessarily, a mountainous and rugged area.—(*Ib.*, p. 10.)

The conclusion of the report last cited is instructive in showing that very much yet remains to be discovered as to the actual extent of the Coosa coal measures, and gives ground for the belief that the Coosa region in that respect is of far greater importance than we now dare dream.

#### The report says:

In the examination of this field, its general structure has been satisfactorily ascertained; and a great increase has been made in our knowledge of its coal seams, and of its coal-producing capacity. Yet much remains to be done to give practical completeness to the investigation. It is an undoubted inference from the structure that many coal seams are yet undiscovered, and many that are known are wholly undeveloped. In some of the basins the underground structure is so completely hidden that only deep boring can reveal their contents.

There are several features of similarity that distinguish these coals, as a class, from other coals. They are highly bituminous, free burning, yet rich in fixed carbon. Soft, easy to mine, free from bone or slaty structure, and also from combined sulphur or pyrites, generally called sulphur flakes, and often and fervently maledicted by the miners in other fields.

They long sustain combustion and leave but little ash or cinder and no clinker, and are hence well adapted for raising steam, for forge work, and for all other purposes of fuel.

The most important characteristic of these coals is in their superior coking qualities. They will rank among the first-class coking coals.—(*Geol. Surv. Ala., 1895, Coosa coal field*, pp. 135, 136, 137.)

A good authority estimates the trade of the Coosa River now navigable, between Rome, in Georgia, and Lincoln or Lock 4, in Alabama, at \$2,000,000 per annum, and the commerce to and from the cities in the valley of the Coosa at more than \$20,000,000 per annum, and this without any water outlet. (Major C. F. A. Flag-

ler, U.S.A., cited in Memorial of Coosa River Improvement Convention, Sept. 27, 1899.)

Give this valley and these cities a water outlet by surmounting the obstructions to navigation created by the rapids, and who can set bounds to the estimates of the increase of this commerce?

Not many years ago steamboats plied between Wetumpka, in Alabama, at the foot of the rapids of the Coosa, and Mobile and New Orleans. Complete the system of locks, and steamboats will start from Rome, Georgia, 863 miles above Mobile, for Mobile and New Orleans.

## NOTES ON THE RECENT PROGRESS OF IRRIGATION IN THE UNITED STATES.

BY

ALBERT PERRY BRIGHAM.

These notes are derived chiefly from the later irrigation papers of the United States Department of Agriculture and from the irrigation literature of the United States Geological Survey, appearing during the past decade. In the Yearbook of the Department of Agriculture for 1899, the "Rise and Future of Irrigation in the United States" is reviewed by Elwood Mead, Expert in Charge of Irrigation Investigations. This is one of a series of historical papers in the same volume, and is perhaps the most comprehensive single utterance upon the subject.

### NATIONAL IMPORTANCE REALIZED.

It can truly be said that we are now beginning to appreciate the meaning of irrigation as a national interest. In the recent annual report of President Wheeler, of the University of California, a department of irrigation is enumerated among the needs of the institution. Almost at once it is reported that such a department has been founded, and that Professor Elwood Mead has been called to fill the chair. The University of Wyoming already gives a course in irrigation; and while specific data are not before the writer, it is safe to say that all agricultural schools within the arid region recognize the subject in some degree. Nor is it forgotten farther east—as, for example, in the horticultural department of the University of Wisconsin. Indeed, all artificial watering of plants falls within the scope of this great department of practical science.

Professor Mead, in the article above named, makes instructive reference to the beginnings of this work in America—in Utah a half-century ago (July, 1849), and at Greeley, Colo. (founded in 1870): "The highest methods both of irrigation and cultivation were sought out through numberless experiments, until Greeley and its potatoes grew famous together. The home and civic institutions of the colony became the pride of the State, and the hard-won success of the community inspired numerous similar undertakings, and furnished an impulse which resulted in the recla-

mations and settlement of northern Colorado." In the light of these inspiring beginnings, the extent of our arid territory gathers surprising meaning. Somewhat more than one-third of the entire territory of the United States, exclusive of Alaska, must depend on artificial watering for its agriculture. Except in limited degree for grazing, these lands have no value without water. With water, they are unsurpassed in fruitfulness. Experts believe that about one-tenth of the total body of arid land can be brought under the plough, if all the water is used to the best advantage. Thus not land, but water, is the great problem of the West. As irrigation is extended, the number of our population increases; towns grow up, manufactures are necessary, railways are multiplied, and the country becomes richer in all the elements of civilization and national prosperity.

It is stated that for Colorado to double the duty of water would increase the public wealth of the State by \$20,000,000; to "double the duty" simply means to make the same water contribute effectively to twice the area of production now utilized. Irrigation and tillage are an essential supplement to the mining, timber and grazing resources of such a region. Cheap and abundant food in full variety is essential to symmetrical development of all the resources of the West. From the simple point of view of taxable wealth, therefore, all our citizens, east and west, have an interest in irrigation. This is the phase of the subject which is beginning to command popular and legislative attention at the national capital and throughout the country. The greatness of our problem cannot be better stated than in Professor Mead's comparison of the Nile and the Missouri:

It (the Nile) supports over 5,000,000 people and pays the interest on a national debt half as large as our own. The Missouri and its tributaries can be made to irrigate three times the land now cultivated along the Nile.

The same writer (Yearbook Dept. of Agriculture, 1899) sets forth the importance of irrigation for the great semi-arid belt of the Dakotas, Nebraska, Kansas and Texas, where thousands of settlers have suffered disappointment and loss in the surely recurring years of drought. Nor is this all. Some of the most recent literature of the subject deals with irrigation, its methods and value, in the humid regions. Thus Bulletins 36 and 87 of the Department of Agriculture, Office of Experiment Stations, give the results of irrigation operations in Connecticut and New Jersey. These papers show the great value of artificial watering, in dry seasons, for fruit, hay and other crops. In his report for 1899



the Secretary of Agriculture makes the interesting statement that a hundred thousand acres of sugar land are under irrigation in Louisiana. Rice fields are irrigated in the Carolinas, and irrigation is on trial in the raising of tea in South Carolina. Thus all the problems of the storage, distribution and application of water become of general interest.

#### PROBLEMS OF IRRIGATION.

From the introduction of irrigation into universities and technical schools, and from the large attention given by government departments, it should appear to all that the highest skill is demanded, and that the fruits of experience must be gathered and transmitted with the least waste to the practical irrigator. Little more than the mention of the problems involved falls within the scope of these notes.

We have first the selection of the land, both as to location and as to quality of soil. If but about one-tenth of the arid region can be brought to tillage, this tenth must be picked with care. If a mistake in location is made, the expense of bringing the water may defeat the purpose of profit. If the best soils within reach of the supply are overlooked, loss will still result. Hence the importance of the soil survey operations now conducted by the Department of Agriculture. Probable accessibility to markets and relation to grazing lands must also be taken into account.

The construction of canals involves questions of engineering, often of no mean kind. How large must the channel be, where it shall run, what will be the losses from leakage—these are among the obvious questions. The duty of water raises another bundle of queries, many of which await full experimentation and records of many years for their answer. The amount of effective work to be done by a given supply of water hinges on soil, climate, crop, and many other conditions.\*

Further questions concern the modes of distribution over the land, and of application to various crops, such as flooding, furrow irrigation, and sub-irrigation. The choice of crops raises a query of very great practical, as well as general, interest, viz., the introduction to our own dry regions of plants which, by long periods of modification, have in other lands become adapted to arid conditions. Nowhere is the invading hand of man exhibited more effectively in the distribution of organisms.

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\* For compact statement on "duty of water," see Bull. U. S. Dept. Agr., No. 73, pp. 41-43, and Bull. No. 81, pp. 27-29.

The Secretary of Agriculture, in his report for 1899, says:

The Department of Agriculture is searching the dry areas of the world for plants that may be successful in furnishing the materials of food to a greater extent than is now practicable on our semi-arid regions. The introduction of sorghum, kafir corn, dry-land alfalfa, the Russian brome grasses, etc., is enabling the farmers of the states west of the Missouri to extend cultivation over lands that did not succeed in corn, or oats, or clover.

#### COMPLICATIONS WHEN THE LIMIT IS APPROACHED.

When all the available land is wanted for actual settlement, then irrigation assumes the highest importance, and offers the most difficult problems. With the keen attention now given, we may hope that the limits will be approached in the light of, experience, and without undue friction and loss. When water from large streams is demanded, the lands will be relatively distant from the tapping point, the canals will be long and large, and the requirements of capital and engineering skill proportionately great. Here we quote Mr. J. C. Ulrich, in Bull. 73, Dept. of Agriculture, upon the magnitude of such works:

Many of these (corporation) canals are more than 50 miles long, and number their water users by hundreds. The Ridenbaugh Canal, in the Boise Valley, Idaho, furnishes water to more than 500 farmers. The High Line Canal, in Colorado, has 433 consumers under it.

Upon many streams of variable volume the water nearly or quite runs away before the season of growing crops. This is true, as cited by Professor Buffum, of some of the best-paying crops, which require water late in the season. Here he names sugar beets, alfalfa, potatoes, and orchard fruits. The same writer continues:

A second-foot of water for the month of August is worth ten to twenty times as much as the same volume for May.

All this brings in the large problem of dams and storage. With storage, and transportation through long canals, in a very dry atmosphere, loss by evaporation becomes highly important. The higher the altitude the greater also the loss. Says Professor Buffum (Bull. 81, p. 22):

In single months which are dry and windy, during the growing season, evaporation of from 7 to 10 inches is not uncommon. For the year evaporation from water surface amounts to four or five times the amount of rainfall. . . . The loss from streams, ditches, and reservoirs in the arid region from this cause is enormous.

In some areas the discharge of streams is very variable from year to year. This must be taken into account. And beyond all other complicating conditions, as the limit is approached, are the "vested rights" of individuals or companies who have taken up lands and used the water according to their own advantage and

without reference to the fullest and most economical development of the region as a whole. This brings us to one of the largest features of our subject, and one which, more pressingly than any other, demands intelligent and firm State and national regulation.

#### LEGAL PROBLEMS AND PUBLIC SUPERVISION.

Here we instructively quote from Farmer's Bull. No. 97, Dept. of Agriculture:

Because of uncertainty of what these rights should be, the irrigation laws of many states have been made so ambiguous and contradictory that the finite intellect is not able to interpret their meaning. As a result there are laws and court decisions to sustain about every view of stream ownership of which the mind of man can conceive. . . . In ten years the water-right litigation of one state is estimated to have cost over a million dollars.

It is interesting to note here the statement of a competent authority, that the statutes of the State of Wyoming have been so wisely drawn as to obviate in great measure such obstruction.

The recent literature shows the evolution of the private ditch, the community ditch, the corporation ditch, the District system of California and some other States, and all leading on naturally to the supervision of the State and national governments. Space forbids many references of great interest, but we must not fail to note the extent of inter-State litigation, and the necessity of some general plan of operation, as in case of the Missouri, whose waters are needed in so many different States. Otherwise there will be no end of litigation as now, or recently, between Colorado and Wyoming on the one hand, and Kansas on the other. Professor Mead puts it, as it seems, none too strongly when he says:

The entire discussion leads up to one inevitable conclusion: This is, that irrigation, over and above all other industries, is a matter demanding public supervision and control. . . . The nation alone can deal with the conflicting rights in inter-state and international streams and with the construction of great reservoirs at their headwaters.

Much might be said of the advantages of irrigation, as they now begin to appear. Not only will the national wealth be enhanced and general prosperity be developed in the West, but farming will be more thorough and exact, its products more diversified, the individual holdings of land smaller, and there will come an admirable training in self-government, and the management of private and public affairs.

#### IRRIGATION STUDY AND LITERATURE.

Only hints can here be given of the channels through which this work is carried on. The Secretary of Agriculture, in his report for

1899, informs us that the first appropriation for investigation by that department became available July 1, 1898. Soon after, a conference of experts was held in Denver, and the work was organized under the direction of Professor Elwood Mead, for study and publication in co-operation with the experiment stations. A series of publications has appeared, from which the foregoing notes have been largely derived.

We now turn to the irrigation work of the United States Geological Survey. As the Department of Agriculture deals chiefly with the equitable distribution and profitable use of water, so the Survey is charged with the study of the water supply, and is gradually furnishing the irrigator with the data which he imperatively needs for sound progress.

The first report of the Irrigation Survey, as it has been called, appeared as one volume of the tenth annual report of the United States Geological Survey in 1890. Successive reports since that time have recorded the progress of the work. Seven quarto volumes in as many years have been devoted wholly to irrigation and general hydrography, besides important papers in other volumes of the Survey reports. In Part 2 of the Eleventh Annual Report (1891) the reader will find a good account of the needs of the arid regions in the form of statements by Major Powell before a Congressional Committee. In the same volume, 44 double-column pages are filled with a bibliography of irrigation, confessedly incomplete even at that time. The next report shows that 147 reservoir sites had been surveyed during the previous year, and contains also an extended report on irrigation under the direction of the English Government in India. This report was a record of investigation by Mr. H. M. Wilson, the author of a valuable article on irrigation, published in this BULLETIN in 1898.

Part 3 of the Thirteenth Annual Report contains accounts of the Platte, Yellowstone, and Upper Missouri basins, and a full review of irrigation engineering in the United States. The Seventeenth Report (1895-'96) has a discussion of the water resources of Illinois, also a paper by N. H. Darton, on artesian supply in the Dakotas—a phase of the subject which is destined to become more and more important, especially for regions at some distance from the mountains and their more abundant waters. At the time of Mr. Darton's writing, about one hundred farms were thus served in the region described.

In the Eighteenth Report, for 1896-'97, we again encounter a portly volume of 750 pages, giving progress of stream measurement

in all parts of the United States, well called a "taking account of stock," as over against the earlier "haphazard" ways. This report gives data for the Potomac, Shenandoah, and James, and, farther south, for the Roanoke, Tar, Catawba, and other waters. Thus the work of the Survey is available for problems of municipal water supply, as well as for agriculture. This volume also contains a report by Leverett on the waters of Indiana and Ohio, and an essay on reservoir construction.

In the Nineteenth Report we have another large volume devoted chiefly to stream measurements. Eastern rivers here receive larger attention than heretofore, and we find very full data upon the rivers of Maine—with the Merrimac, Connecticut, Hudson, Delaware, and Susquehanna. The Rock Waters of Ohio are discussed by the late Dr. Edward Orton, and Mr. N. H. Darton reviews the water supply of Western Nebraska. In the Twentieth Report the volume on Hydrography includes a report by Mr. A. P. Davis, detailed to investigate the hydrography of Nicaragua in the interests of the interoceanic canal project.

In addition to the annual reports, as authorized by act of Congress in 1896, a series of pamphlets has been issued, known as Water-supply and Irrigation Papers. About thirty of these have now appeared, and many subjects of immediate value to irrigators are treated. Several papers give accounts of irrigation in special regions—as, for example, near Greeley, Colo., and near Fresno, Cal. Five deal with windmills and pumping operations, two take up sewage irrigation, one discusses water-rights, and several are devoted to water supply.

This review would be incomplete without reference to the National Irrigation Association, of which Mr. George H. Maxwell is Executive Chairman and Mr. Guy E. Mitchell, Corresponding Secretary. It has a Washington office located at Room 6 Glover Building. Under the auspices of this association, an Irrigation Congress was held at Chicago late in November, 1900, and its proceedings at that time attracted attention throughout the country. The objects appear to be the dissemination of information and the promotion of national legislation on this subject. The advocates of such public action claim that no burden will be imposed on the East for the benefit of the West, but rather that the lands under the ditch can be sold to settlers at rates that will fully reimburse the Government for outlay in the construction of reservoirs and canals:

This reclamation, when accomplished, will add to the permanent taxable national wealth beyond the computation of any man. And it is easy to imagine what all this

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will mean to the Eastern factory-owner, to the wholesalers, to every factor of production in the East; also, what it will mean in the way of increased freight and passenger earnings of every railway system in the nation when arid America is redeemed.

The foregoing is quoted from one of the addresses made in Chicago. If the view seems too optimistic to some, it must at least command attention. Perhaps no single economic problem in the United States is equal in importance to this, and certainly no theme surpasses irrigation in its typical geographical quality.

## M. FROIDEVAUX'S PARIS LETTER.

PARIS, January 17, 1901.

If, in studying the different official geographical institutions of France, it is not absolutely indispensable to follow a strict chronological order, the case is very different with regard to private institutions. In fact, all our geographical societies have been modelled upon the oldest of all—the Société de Géographie, of Paris, the most ancient in the world. It is of this Society that I propose first to speak.

Its establishment dates from the year 1821, but it would be an error to conclude that the question of founding a geographical society in France had not previously suggested itself. It was in 1785 that an anonymous writer—who was, perhaps, the geographer J. N. Buache—submitted to the approbation of one of the Ministers of Louis XVI. a complete plan for constituting an association intended to *carry the science of geography to its utmost possible perfection*.

The King, whose interest in geography is well known, might possibly have looked with favour upon the plan for the creation of this company (which seems to have been a kind of geographical academy) if it had been laid before him; but, to the great detriment of French cartography, the project never became vital.

A few years later, soon after the period of The Terror, there was founded in Paris a *Société de l'Afrique Intérieure*, after the manner of the *African Society*, formed in London in 1788. The astronomer Jérôme Lalande, author of a memoir, famous in its day, on the interior of Africa, and a persistent propagandist of all enterprises directed towards the Dark Continent, seems to have been the founder of the new Society, which was joined immediately by the distinguished traveller Le Vaillant, by Bougainville and Baudin. Little is known of its transactions; but the Society was still in existence in the year IX, when it gave a banquet to Baudin, who was making preparations for the voyage to Australia to which he owes his reputation.

Afterwards removed to Marseilles, the Society published a body of rules which shows that it was engaged in creating a complete scientific organization, like those of the modern geographical societies: public meetings with lectures, award of prizes, publication of memoirs and library—nothing is wanting; it was even pro-



posed to form a natural history collection, probably with the objects brought back from Africa by travellers commissioned by the Society. But all these projects came to naught, all trace of the Society is lost after the 9th of August, 1802, and if it survived for a time it was without attracting attention or carrying out any of its plans.

The Société de Géographie was founded in 1821 by "several persons earnestly desirous of contributing by their united efforts to the progress of geography." Among the first associates were Conrad Malte-Brun, Jomard, Barbié du Bocage, Letronne, and others, and the first president of the Society was the illustrious Laplace. After having founded prizes, created a publication, the *Bulletin* (which was issued without a break from the month of June, 1822, to the close of the year 1900), and established the publicity and the regularity of its meetings, this oldest of all geographical associations entered upon its existence and labored with all its power, while closely following the advance in our knowledge of the globe, to cultivate in France the taste and the study of geography. I propose to explain in my next letter the present working and the organization of the Société de Géographie.

On the 5th of December, 1900, the Société received, at the Sorbonne, the members of the Saharan Mission which, under the prudent and skilful direction of M. F. Foureau and the regretted Comm. Lamy, established communication between Algeria and the French Congo. Crampel, in 1890, had laid down the great lines of the plan followed out by the Gentil expedition from the Congo to the Tchad in 1897, and by that of the Saharan Mission to the same great lake.

M. Foureau was singularly well fitted to accomplish his difficult task. In 1876 he explored the Sahara, carefully studying the region south of Algeria and remaining for a time in the Oued-Rirh, and accomplishing in the south, from the year 1883, nine successive expeditions for the Ministry of Public Instruction, all fruitful in scientific results, geographical surveys, astronomical and meteorological observations, and collections of all kinds. When he set out in 1898, on his last expedition, his journeys amounted to a total of 21,000 kilometers, 9,000 of which were in new regions. Of these 21,000 kilometers two-thirds had been surveyed on a scale of 1:100,000, and 500 points had been established by determinations of longitude and latitude. Not content with the physical examination of the regions traversed, M. Foureau had studied the inhabitants, their state of mind and their manners and language, so as to acquire a real ascendancy over them. Such efforts were worthy of

recompense. After having been baffled for several years by the obstinate ill-will of the Touaregs, and recognizing that the only certain way of succeeding in a great exploration of the Sahara was to do without the natives and to travel with an escort of 150 faithful men, well disciplined and well armed, M. Foureau found at last his Mæcenas, and was able to carry out his long-cherished design.

The difficulties encountered from October, 1898, to April, 1900, when he met M. Gentil at Mandjafa, were related by M. Foureau to the Société in a style full of colour and charm, and may be read in the December number of *La Géographie*. The scientific details will be published at a later day; it is enough now to mention that M. Foureau determined the principal points of his march by 512 astronomical observations. Geology, botany, ethnography—nothing was overlooked by him; but passing over his collections, the Minister of Public Instruction congratulated M. Foureau that he had shown himself throughout his journeys heroic without ceasing to be humane.

At a later session of the Société, M. Bonnel de Mézières rendered an account of his expedition to the Upper Ubangi, the M'Bomu and the Bahr-el-Ghazal, with results fruitful for science as well as for commerce.

In another part of Africa, Capt. Woelfel, in 1899, filled up a blank previously existing on the map in the countries of the Sudan between 9° and 6° 40' N. Lat. and 7° and 9° W. Lon. M. Chesneau, in a note published in *La Géographie*, shows that M. Woelfel explored the country which constitutes the water-shed between the basin of the Niger and the smaller basins along the coast of the Atlantic. This is much the most elevated and the most broken region of the whole Sudan.

In Asia M. Grenard is exploring the little-known country within his consular district. From his residence of Sivas he made in the autumn of 1900 a journey beyond the Euphrates, visited the Kurds, and brought back numerous corrections for the existing defective maps of that region.

M. Bonin, already known by his explorations in China, has not yet published the results of his last journey, but his address before the Société in January establishes the value of his work. He has recently contributed to the *Revue Coloniale* a "Note on the Navigability of the Yellow River." There is, it appears, no insurmountable obstacle to the navigation of the Hoang-Ho.

The holidays produced some works interesting to geographers. One, *Notre Épopée Coloniale*, by M. P. Legendre, traces the history

of French colonization from the earliest times—that is to say, from the period when the Normans ventured as far as Guinea, in Western Africa, from the time when Jean de Béthencourt colonized the Canaries—to the end of the XIXth century. This work is historical as well as geographical, but the book published by Father Piolet on Madagascar is exclusively geographical. Father Piolet has lately visited the great island, to which he had already devoted several works. The present volume is the first of a superb collection on the *Empire Colonial de la France*, to be written by contributors of indisputable authority. The artistic part of this handsome series will be under the charge of M. Gervais Courtellemont. A companion work to that of Father Piolet is the *Voyage du Général Gallieni autour de Madagascar*, edited by an officer on the staff of the Governor-General.

More and more our geographical literature tends to become colonial. In this place particular mention is due to Father Piolet's book, entitled *La France hors de France*, which contains not only an excellent study of demography (wherein the author proves that, if the Frenchmen emigrate very little, there exists none the less in France a very considerable number of men fit for emigration and who ought to emigrate), but also a very serious study of economical geography on our best colonies—Algeria, Tunisia, Madagascar, New Caledonia. It is to these, says Father Piolet, that our emigrants should, above all, betake themselves. This part of *La France hors de France* forms in some respects a pendant to the excellent work recently published in London by Mr. Hugh Robert Mill, under the title of *New Lands: their Resources and Prospective Advantages*.

The work in which M. Charles Michel has just related the fruitless march of the expedition to which he belonged to meet Marchand recommends itself by other qualities. It is a very detailed and lively account of the journey towards Fashoda from Jibuti to the confluence of the Sobat and the Juba; it contains also the account of the excursion performed by the regretted Maurice Potter and by M. Faivre de Goré as far as the White Nile, an excellent study of the Abyssinians, and a remarkable statement of some of the causes which brought about the failure of the French projects on the Nile. Scientific appendices and reproductions of photographs and drawings add to the value of this volume.

Another remarkable work is that of Father Lambert on the *Mœurs et Superstitions des Néo-Calédoniens*. Father Lambert has studied curiously and with patience the life of the strange people among whom he has lived since the year 1856. His observations

on the Bélep tribe, which inhabits the north, and the natives of the Isle of Pines, have led him to the conclusion that the manners of the peoples of the north and of the south of New Caledonia are practically identical. It would be well if there existed, on the people of each one of our colonies, a work as carefully executed as this of Father Lambert, which has but one weakness—its engravings are a little primitive in style.

I may mention also the book in which M. A. Foucher describes his two years' travel in an interesting Asiatic region—*La Frontière Indo-Afghane*; and another, *Voyages en Patagonie*, written by M. Henri de la Vaulx, recounting his adventures in Patagonia, where he collected the precious anthropological and ethnographical objects now in the Muséum d'Histoire Naturelle and in the Musée d'Ethnographie du Trocadéro.

HENRI FROIDEVAUX.

## OBITUARIES.

### LUCIANO CORDEIRO.

This distinguished Portuguese geographer died at Lisbon on the 22d of December, 1900, at the age of fifty-six years.

Senhor Cordeiro entered the navy as a midshipman, but soon left the service in order to devote himself to a literary career and to journalism. As a writer and a member of the Chamber of Deputies, in which he sat for a time, he was recognized at home and abroad as a vigorous and able champion of his native land.

His interest in geography was manifested throughout his career. He was the founder of the Lisbon Geographical Society, its Secretary from its beginning in 1875, and one of the contributors whose labours have made the volumes of the *Boletim* a storehouse of information on the history of Portuguese discovery and colonization.

### SERPA PINTO.

Alexandre Alberto da Rocha de Serpa Pinto, one of the famous African explorers of the last century, died at Lisbon on the 29th of December.

He was born in 1846 at Tendaes, on an affluent of the Douro. In 1848 the family removed to Brazil. On their return, ten years later, Alexandre entered the Military College, and received, in 1864, a commission in the Seventh Infantry. For some years he served in East Africa.

In 1871 he returned to Europe and remained there for six years, engaged in the routine of military duty, but cherishing the thought of exploring Africa and preparing himself by study for the task:

An officer in the army, always in garrison in small provincial towns, I was accustomed to convert my leisure hours into hours of labour, and, though the opportunity of exploring Africa seemed to be problematic and very remote, the study of the questions which relate to it became my ordinary pastime; nor did I neglect astronomy. In this way my life in barracks, once my military duties discharged, was divided between the heavens and Africa.—(*How I Crossed Africa*, Vol. 1, p. 1.)

His opportunity came in 1877 when, with Brito Capello and Roberto Ivens, he set out from Benguela on the expedition to explore the hydrographic relations between the basins of the Congo and Zambezi. At Caconda the three leaders parted company; Capello and Ivens went to the north, while Serpa Pinto continued his march to the eastward by a route which he was the first to map. He descended the Zambezi, crossed the country to the eastern

edge of the Kalahari Desert, and early in 1879 embarked at Durban, having passed through the South African Republic.

Another expedition, undertaken in 1884, was broken up by failing health.

In 1894 Serpa Pinto attained the rank of general, and was made governor of the Cape Verde Islands.

ALVAN S. SOUTHWORTH.

Mr. Southworth died on the 7th of January, at the age of fifty-five years.

He was born in Lockport, N. Y., and entered the Naval Academy, when it was situated at Newport, during the Civil War. He was not graduated, however, but withdrew and went abroad.

He was a newspaper correspondent during the Franco-Prussian War, and afterwards went to Egypt. He returned to America in 1873 and was elected Recording Secretary of this SOCIETY, a position which he held for three years. After his retirement he became a writer for the periodical press.

His Egyptian experiences are recorded in his book, *Four Thousand Miles of African Travel*, published in 1875.

# ACCESSIONS TO THE LIBRARY.

JANUARY-FEBRUARY, 1901.

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- BASSETT, JAMES.—Persia, the Land of the Imams. New York, Charles Scribner's Sons, 1886. 8vo.
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- BENGER, G.—La Roumanie en 1900. Paris, H. Le Soudier, 1900. 8vo.
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- BUDD, THOMAS.—Good Order Established in Pennsylvania and New Jersey in America, etc., (1685). Reprint, New York, W. Gowans, 1865. 8vo.
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- Colección de Documentos Inéditos, etc., etc., Tomos 12-13. Madrid, Sucesores de Rivadeneyra, 1899-1900. 8vo.
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- DELLENBAUGH, F. S.—North Americans of Yesterday. New York, G. P. Putnam's Sons, 1901. 8vo.
- Description of the Island of St. Helena. London, R. Phillips, 1805. 8vo.
- DESSIOU, J. F.—Le Petit Neptune Français. 3rd edition. London, W. Faden, 1805. 4to.
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- EDWARDES, CHARLES.—Rides and Studies in the Canary Islands. London, T. Fisher Unwin, 1888. 8vo.
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- FOGG, ALONZO J.—Statistics and Gazetteer of New Hampshire. Concord, N. H., D. L. Guernsey, 1874. 8vo.
- FOUCHER, A.—Sur la Frontière Indo-Afghane. Paris, Hachette, 1901. 16mo.
- GORDON, LINA DUFF.—The Story of Assisi. London, J. M. Dent & Co., 1900. 8vo.
- HALES, JOHN G.—Survey of Boston and Its Vicinity. Boston, Ezra Lincoln, 1821. 12mo.
- HALLIER, ERNST.—Helgoland. Hamburg, Otto Meisner, 1869. 8vo.
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- HUNTER, F. M.—Account of the British Settlement of Aden in Arabia. London, Trübner & Co., 1877. 8vo.
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BY GIFT.

*From E. L. Corthell :*

Informe del Ingeniero Elmer L. Corthell sobre los Canales de Acceso al Puerto Madero. Buenos Aires, 1900. 8vo.

*From Dr. H. Fritsche, Author :*

Die Elemente des Erdmagnetismus und Ihre saecularen Aenderungen während des Zeitraumes 1550 bis 1915. Publication III. St. Petersburg, 1900. 8vo.

*From James Green, Author :*

Causes of War in South Africa. Paper read before the Worcester Society of Antiquity. Worcester, Mass., 1900. 8vo.

*From Benjamin Smith Lyman, Author :*

Movements of Ground Water (Reprint from Journal of the Franklin Institute), October, 1900, 8vo; Notes on Mine-Surveying Instruments, etc. (Canadian Meeting, American Institute of Mining Engineers, August, 1900), 8vo; Importance of Topography in Geological Surveys (Reprint from the Mining and Metallurgical Journal, Vol. XXIII, No. 5), Dec. 1, 1900, 8vo.

*From Henri de Sarrauton, Author :*

Jour et Cercle de 24 Heures. *Extrait du Bulletin de la Société de Géographie d'Alger*, 3<sup>e</sup> Trim., 1900. 8vo.

*From the South African Museum, Cape Town :*

Annals : Vol. II, Part IV, Dec. 4, 1900.

*From Dr. Guilherme Studart (Barão de Studart), Author :*

Apontamentos Bio-Bibliographicos. Fortaleza, 1900. 8vo.

*From Henry Wallach, F.R.G.S., London :*

Map of the Gold Coast, with Part of Ashanti, showing the Positions and Areas of Mining Properties. By Henry Wallach, F.R.G.S. London, Stanford's, November, 1900. 4 sheets, 32×25 in.

*From the War Department, Washington, D. C. :*

Report on the Census of Porto Rico, Washington, 1900. 8vo; Copper River Exploring Expedition, 1899, Captain W. R. Abercrombie, Commanding. Washington, 1900. 8vo.

## NOTES AND NEWS.

THE NEXT MEETING of the Society will be held at Mendelssohn Hall, No. 119 West Fortieth Street, on Tuesday, March 19, 1901, at 8.30 o'clock, P.M. Mr. Herbert M. Wilson, of the U. S. Geological Survey, will deliver a lecture on Examples of Topographic Forms in the United States.

At the meeting to be held on Tuesday, April 16, Prof. Charles L. Bristol, of New York University, will address the Society on the Geography of Bermuda.

IT IS ANNOUNCED that the Weather Bureau has now established stations for meteorological observation, from the northern coast of South America to Hamilton, Bermuda. This point is connected by cable with Halifax, Nova Scotia, and the chain of posts thus completed brings within reach a more accurate forecast of weather conditions on the ocean and the east coast of the United States.

Arrangements have also been made by the Weather Bureau for a daily report from the Meteorological Observatory at St. Michaels, Azores, to be collated with telegraphic reports from London of the conditions to the west of Spain, France and Ireland, so as to furnish an approximate survey of the weather on the Atlantic.

The Bureau has begun to issue to the captains of European steamers leaving New York predictions for three days out, with forecast of wind force and wind direction. Similar predictions are supplied to the officers of steamers leaving European ports for this country.

MORE THAN THREE HUNDRED pages in the Annual Report of the Geological Survey of New Jersey for 1899 are devoted to a Report on Forests, illustrated by 31 plates and a number of maps in the text, and an atlas of seven large-scale sheets, showing the wooded areas of the State.

The Report says that New Jersey has ceased to be a lumber-producing State, most of the large timber having disappeared before 1860.\*

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\* A foot-note says: "The largest white-oak tree in the State is in Gloucester County, three miles north of Mickleton, and its dimensions, as given by Dr. J. T. Rothrock, are: Height, 95 feet; diameter of trunk, three feet above the ground, 7 feet 10 inches; spread of branches, 118 feet."

This tree, it is added, is older than the settlement of the country.

Taking the State as a whole, it appears that there is now nearly as much forest as there was in 1860, and that the deciduous timber has increased in size and improved in quality within the past twenty years.

The forest area of the State amounts to 2,069,819 acres, or 46 per cent. of the upland area. This is almost exactly equal to the area of improved land in farms.

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DR. REGINALD A. DALY, of Harvard University, is to conduct an exploring expedition to Labrador, Greenland and Iceland in the summer of 1901. The plan is to charter a steamer of 1,000 tons to accommodate a party of sixty men. The main object of the voyage will be to study the lava fields, geysers and glaciers of Iceland, the fiords and glaciers of the west coast of Greenland, and the mountains and fiords of northern Labrador. A hunting party may be landed for a fortnight or three weeks in Greenland, and also in Labrador. Explanatory lectures on the regions visited will be given by the leader of the excursion. On the Labrador coast Dr. Daly will act as guide himself, as he spent the summer of 1900 there with a party. In Greenland and Iceland specialists on the geology and physical geography of those countries will lead the expedition.

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AT A MEETING of the Italian Geographical Society, held on the 14th of January, the Duke of the Abruzzi and Commander Cagni told the story of their famous Arctic expedition to an audience which included the dignitaries of the kingdom and of the city of Rome, the members of the Diplomatic Corps, the royal family, and the King and Queen of Italy.

The work of two explorers in the Arctic, the Duke said, had especially attracted his attention for the immense distances travelled with dog sledges; these were the journeys of Peary on the inland ice of Greenland and those of Wrangell in northern Siberia.

The plan of a polar expedition took definite shape in his mind in January, 1899, after conferences held with Nansen.

This plan was simple enough: to establish a base in Franz Josef Land, and from that to push towards the Pole in sledges.

The base chosen was Teplitz Bay, on the west coast of Kronprinz Rudolf Land, and it was here that on the 9th of September the *Stella Polare* narrowly escaped destruction from the closing in of the ice.

In December began the preparations for the sledge journey to

the north. Two days before Christmas the Duke and Comm. Cagni, returning from an excursion with the dogs, missed their way and fell into the bay from a height of about twenty feet. They were rescued in a half hour, but with frozen fingers.

The temperature in January ranged from  $30^{\circ}$  to  $40^{\circ}$  below zero (Cent.),  $22^{\circ}$  to  $40^{\circ}$  below zero (Fahr.). The health of the party was excellent.

Thus far the Duke. Comm. Cagni followed with a brief account of the sledges, the manner of loading them with provisions and instruments, and the measurement of supplies for a contemplated journey of 480 miles in 45 days:

"Certainly," he said, "it seemed over-bold, even to ourselves, to count upon a daily march of more than ten miles; but the example of Wrangell and of Peary filled us with hope greater than the discouragement we found in the experiences of Parry and Markham, and even of Nansen. And upon these definite bases we made all our preparations."

He then described, with simplicity and force, the start on the 21st of February, the events of the journey, the violent winds and the bitter cold, and the steady progress in the face of difficulties. On the 22d of March it was decided to send back to the camp the first group of three—Lieut. Querini, the guide Ollier and the machinist Stökken. They set out the next day, to be seen no more.

It was the 11th of May when the party reached the highest north in  $86^{\circ} 33'$ . Three tin cylinders, containing the record, were deposited on the spot, and the homeward march was begun. The rate of travel, which had generally fallen below the ten-mile standard, now exceeded it, and Teplitz Bay was reached on the 22d of June.

Capt. Cagni notes that, with the exception of the reindeer boots, the borders of the hoods and sleeves, and the sleeping-bags, the wearing apparel of his party was of cloth and wool.

The Duke of the Abruzzi summed up the geographical results of the expedition as follows:

Petermann Land and King Oscar Land are to be erased from the maps;

Cape Sherard Osborn certainly forms no part of Kronprinz Rudolf Land, and the Duke, in his long stay at Cape Fligely, was unable to discover any land in the direction assigned by Payer to Cape Sherard Osborn;

The islands marked in Wellman's map to the north of Hvidtland, between that and Kronprinz Rudolf Land, were not to be described from Cape Fligely, which is, therefore, the most northern point of the Franz Josef group; not, as marked on the maps, in  $82^{\circ}$  N. Lat., or over, but in Lat.  $81^{\circ} 51'$ .

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THE FOLLOWING NOTE appears in *Nature*, of January 10:

The fall of two of the stones of the outer circle of Stonehenge, on the last evening of the nineteenth century, directs attention to the necessity for at once taking steps

to preserve this remarkable prehistoric monument. . . . An engineer, writing to the *Times*, suggests a method of undermining the stones, and imbedding them in a foundation of concrete or cement. A scheme of this kind would cost comparatively little, and there should be no difficulty in obtaining funds to carry it out. . . .

WORK ON THE International Catalogue of Scientific Literature was to begin on the 1st of January, 1901, and to include all literature published after that date.

The Royal Society act as publishers of the Catalogue and sign the necessary contracts.

At the end of December the number of copies of sets subscribed for was 290, of which the United States take 68, Great Britain and Germany each 45, France 35, Italy 27, Japan 15 and Switzerland 7; Sweden subscribes for  $6\frac{1}{2}$  and Canada for  $4\frac{1}{2}$  sets.

The annual cost of each set is 17 pounds, or 85 dollars.

Three countries—Russia, Belgium and Spain—have not yet joined in the scheme.

MR. BORCHGREVINK addressed the Berlin *Gesellschaft für Erdkunde*, on the 2d of February, on the subject of his Antarctic expedition.

It was on the 30th of December, 1898, that the *Southern Cross* encountered, in S. Lat.  $51^{\circ} 56'$ , the heavy pack ice which held her fast till January 26, with a pressure that sometimes lifted the ship four feet. Open water was reached at last, and on the 16th of February Victoria Land was sighted, and the next day the ship entered Robertson Bay; the stores were landed and the tent was set up at Camp Bidley, the winter station. The tent was protected on all sides by sloping walls, and, thanks to this precaution, it was able to resist the fury of the terrible southeast storms.

Borchgrevink climbed the steep cliffs of Cape Adare to the height of 1,376 feet, finding traces of vegetation at 800 feet.

The winter began to make itself felt early in March. The first aurora was seen on the 15th of March, and then came fearful storms—the wind blowing as much as eighty-seven miles an hour.

The polar darkness was felt to be strangely depressing by every one. The only distractions were chess and cards, until there was a prospect of varying the monotonous bill of fare by the addition of fish, when all took to fishing.

In the middle of August the thermometer marked  $46^{\circ}$  below zero (Cent.) ( $51^{\circ}$  below zero Fahr.). Several excursions were made during the winter, and Borchgrevink discovered in the mountains minerals of value, over which he hoisted the English flag. Returning from



one of these excursions, in October, he found the zoologist Hansen in a dying condition.

The penguins and the gulls began to come at the end of October. The storms seemed to increase, and one blew ninety-nine miles an hour. These tempests Mr. Borchgrevink seems to regard as peculiar to the Antarctic, and he says they are never to be left out of the calculation when an expedition is planned.

Preparations were made to observe the eclipse of the sun on the 3d of December, but the sky was covered with clouds.

It was noted, however, that there was a change of temperature during the eclipse.

Early in February, in the neighborhood of Possession Island, favorable magnetic observations enabled the explorers to calculate the position of the magnetic south pole. A landing was made on Franklin Island, and the volcanoes Terror and Erebus were visible in the south—the latter in activity. There is a small flat beach at the foot of Mt. Terror, and, while waiting there for the return of the boat from the ship, Borchgrevink and Captain Jensen narrowly escaped death. An iceberg plunged from a glacier into the sea and threw up a wave which swept over them and almost tore them from their hold on the crags.

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We regret to record the death, on the 14th of January, of the Cavaliere Ingegnere MATTEO FIORINI, for many years Professor of Geodesy in the University of Bologna.

## TRANSACTIONS OF THE SOCIETY.

JANUARY-FEBRUARY, 1901.

The Annual Meeting of the Society was held at Mendelssohn Hall, No. 119 West Fortieth Street, on Tuesday, January 22, 1901, at 8.30 o'clock. P.M.

President Low in the chair.

The following persons, recommended by the Council, were elected Fellows:

R. Napier Anderson.	J. P. Morgan, Jr.
Alexander Brown, Jr.	Austin W. Lord.
Henry De Coppet.	William Lawson.
Rev. James S. Dennis.	Thomas H. Hubbard.
Henry Belknap.	V. Everit Macy.
Miles M. Dawson.	Dr. George N. Miller.
Anson R. Flower.	Louis Sather Bruguière.
Frederick S. Flower.	Henry Hentz.
David Willcox.	F. Warren Montgomery.
James Curran.	Wainwright Hardie.
James J. Faye.	Herman Vogel.
Baron H. Arnous de Rivière.	Harry H. Meyer.
Charles H. Haswell.	Henry E. Montgomery.
Augustus L. Hyde.	John S. Durand.
George B. Hopkins.	Charles H. Marshall.
Alexander P. Ketchum.	George H. Macy.
G. Weaver Loper.	John W. T. Nichols.
Thomas E. Kirby.	Carl Fischer-Hansen.
R. Johnson Held, M.D.	Dunham Jones Crain.
H. B. Laidlaw.	W. F. Owens.

The Annual Report of the Council was then submitted and read:

NEW YORK, January 5, 1901.

*To the American Geographical Society:*

The Council respectfully submit the following report for the year 1900.

The number of Fellows on the 1st of January was 1,164. The additions during the year number 50. The losses by death, resignation, etc., were 97, and the total Fellowship on the 31st of December was 1,120, of which number 297 were Life Fellows.

The additions to the Library number 4,232, viz.: Periodicals and Pamphlets, 2,655; Books, 1,253; Maps and Charts, 301; Atlases, 23.

Six meetings of the Society were held in the year. That of January was devoted

to a commemoration of the late President Charles P. Daly. At the other meetings papers were read by:

Prof. T. C. Mendenhall on the Alaska Boundary;

President Schurman, of Cornell University, on the Philippine Islands and their People;

Herbert L. Bridgman on the Cruise of the Diana and Peary's Work in the Arctic;

Edward Whymper on Mountain Climbing, Twenty thousand Feet above the Sea;

W. A. P. Martin, D.D., On the Siege in Peking: its Causes and Consequences.

There have been published in the BULLETIN, which has appeared with regularity, twenty-three original papers, besides the usual Record and Scientific notes.

For the condition of the finances, reference is respectfully made to the report of the Treasurer, herewith submitted.

The Society's building in Eighty-first street is in process of construction, and the architects promise its completion before midsummer. There have been expended on the lots and building \$158,519.73—of which amount generous friends of the Society have furnished \$32,165, and the remainder has been paid out of the resources of the Society. Since the last report the following additions to the Building Fund have been made\*:

W. J. Bormay.....	\$15 00
James Douglas.....	250 00
John Greenough.....	1,000 00
J. J. Higginson.....	100 00
J. J. Hill.....	100 00
Gustav E. Kissel.....	500 00
Chandler Robbins.....	500 00
T. G. Sellew.....	250 00
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	\$2,715 00

The establishment of the Society in this ample and commodious home will relieve it of the embarrassments under which it has labored for so long a time, and increase in every way its power for usefulness.

All of which is respectfully submitted.

HENRY PARISH,  
*Chairman.*

LEVI HOLBROOK,  
*Secretary.*

The Report of the Treasurer was then presented and read:

#### AMERICAN GEOGRAPHICAL SOCIETY.

##### *General Account.*

The Treasurer respectfully reports that on January 1st there were in the Union Trust Co.....	\$5,154 27
During the year there have been received from Fellowship Dues, Sales of Publications, and interest on invested Funds .....	16,409 87
From Sales of Investments.....	73,750 00
Donations to Building Fund.....	2,715 00
	<hr/>
	\$98,029 14

\* A contribution of two hundred dollars has since been received from Miss Luella Agnes Owen.

There have been expended for Salaries, Library, Publications, Meetings, House a/c, Insurance, Postages, etc., etc.....	\$11,243 15	
And there have been paid on account of construction of the Society's new fire-proof building on West 81st street.....	67,138 92	78,382 07

On December 31st there are in the Union Trust Co. to the credit of General Account..... \$19,647 07  
 NEW YORK, December 31, 1900.

W. R. T. JONES,  
*Treasurer.*

REPORT OF THE NOMINATING COMMITTEE.

The Committee appointed to recommend to the Society suitable persons to be elected in January, 1901, to fill vacancies then occurring in its offices, respectfully report :

That they would recommend the election of the following named persons to the offices below designated :

- President—SETH LOW, term to expire in January, 1902.
- Vice-President—D. O. MILLS, term to expire in January, 1904.
- Treasurer—WALTER R. T. JONES, term to expire in January, 1902.
- Recording Secretary—ANTON A. RAVEN, term to expire in January, 1904.
- Councillors—LEVI HOLBROOK,  
 MORRIS K. JESUP,  
 GUSTAV E. KISSEL,  
 HENRY PARISH,  
 JOHN A. HADDEN, } Terms to expire in January, 1904.

Respectfully submitted.

(Signed.)

FRANCIS M. BACON,  
 W. H. H. MOORE,  
 S. NICHOLSON KANE,

*Committee.*

December 20, 1900.

On motion, Mr. Albert Operti was appointed to cast the vote of the Society for the candidates, and they were declared duly elected.

The President returned thanks to the Society for the honor conferred upon him by their choice, now reaffirmed for the ensuing year, and then introduced the speaker of the evening, Dr. A. F. Schaffler, who delivered a lecture on Constantinople.

The lecture was illustrated with stereopticon views.

On motion, the Society adjourned.

A regular meeting of the Society was held at Mendelssohn Hall, No. 119 West Fortieth Street, on Wednesday, February 20th, 1901, at 8.30 o'clock, P. M.

President Low in the chair.

The following persons, recommended by the Council, were elected Fellows:

F. A. Parsons.	William Fitz Hugh Whitehouse, Jr.
Walter Coles Cabell.	John N. Beckley.
J. Harsen Purdy.	William C. Sturges.
Stephen H. P. Pell.	Robert F. Ballantine.
Charles Kohlman.	Geo. Barclay Rives.
Robert Maxwell.	Chas. F. Smillie.
Josiah C. Reiff.	Safford Goodwin Perry.
Thomas B. Rea.	James Pech, LL. D.
Samuel Riker.	Rev. Arthur Lawrence.
Edgar E. Saltus.	Gamaliel Bradford.
Isaac N. Seligman.	William Farnsworth.
William G. Slade.	Edward C. Johnson.
William H. Leupp.	George G. Kennedy, M.D.
Charles D. Stickney.	Albert Matthews.
George L. Stebbins.	William W. Swan.
Charles Robinson Smith.	Alden Sampson.
W. S. K. Wetmore.	E. M. Fulton, Jr.
James M. Wentz.	William Kent.

The President then rose and addressed Dr. Thomas C. Mendenhall, present by invitation, as follows:

It is my privilege to present to you this evening the Cullum Geographical Medal, awarded by unanimous vote of the Council for your long-continued and fruitful labours in the cause of science, and specifically for your valuable services to the science of geography in your position as Superintendent of the United States Coast and Geodetic Survey for the period 1889-1894.

Fittingly to direct a branch of governmental work, so important and so far-reaching in its influence, is to deserve well of one's country; and I feel that I give expression to the judgment of all in saying that your administration of the Survey has long called for a public recognition by reason of its unsurpassed efficiency and its high standard of excellence.

Dr. Mendenhall replied:

Nothing has ever come to me more unexpectedly than the announcement that the American Geographical Society had conferred upon me the Cullum Geographical Medal, and nothing that has come has been more pleasing. I can but inadequately express to the Society my gratitude at this more than generous appreciation of my work, but I cannot do less than thank you most sincerely for the high honor of which I am now the recipient. Since receiving the announcement of the Society's action I have spent no little time in trying to discover why it should have been taken. I am not inclined to attribute it to any personal merit of my own, but rather to a disposition to recognize the kind of geographical work in which I have long been interested. I mean by this what I may call geography of precision, not as opposed to, but as parallel with, geography of discovery. This world is so small and geographers have

been so many and so active that geography of discovery is nearing its end. Not many areas now exist that have not been explored by intelligent and courageous travellers. In the geography of position and form, however, very much remains to be done. The dictionary, to which we often last go for the meaning of a word, says that geography is that science which treats of the world and its inhabitants. It is thus the most comprehensive and inclusive of all sciences, and as long as there is anything to learn about the earth or its people the Society will not be without occupation. Certainly such problems as that of the Figure of the Earth, which Humboldt declared to be the most fruitful that has ever occupied the attention of man in the importance of the scientific methods and results that have come from its study, are fit to demand the recognition and support of the Society. And this is also true of problems relating to its motions, its mass, terrestrial gravity, terrestrial magnetism, and all that is included in the term terrestrial physics. It is encouraging to feel that this great Society is ready and willing to recognize in the bestowal of its honors those who have given special attention to this phase of geographical work, and as evidence of this willingness I accept this medal, again assuring you of the great pleasure I have in so doing.

President Low then introduced the speaker of the evening, Dr. George F. Becker, who addressed the Society on the Conditions requisite to our Success in the Philippine Islands.

On motion, the Society adjourned.